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ABSTRACT

This collection of 34 papers from various nations reflects the state of the art in the development of community-based medical educational programs. Papers are grouped into the following topical areas: (1) community-oriented education, (2) evaluation, (3) innovation and change, (4) problem-based learning, (5) administration of education, and (6) medical education worldwide. Specific topics of papers include: demonstration programs, models, community based health programs, rural community programs, evaluation of innovative programs, evaluation models, outcomes evaluation, evaluation of problem based medical education, evaluation of tutor effectiveness, lecturer evaluation, the use of evaluation to effect program change, materials for problem based learning. use of standardized patients, admission to medical education, the World Federation for Medical Education, the World Health Organization's agenda for changing medical education, and research in medical and health professional education. Countries represented include the Sudan, Nigeria, the United States, Senegal, Canada, Australia, the Netherlands, Bulgaria, New Zealand, the United Kingdom, Indonesia, and Sweden. A bibliography lists 48 recent books, 19 journals and newsletters, and 53 abstracts of recent papers addressing: administration, assessment, community-oriented and general practice, educational methods, evaluation, problem-based learning, problem solving, skills training, students' learning, research, and teaching. Institutional members of the Network of Community-Oriented Educational Institutions for Health Sciences and members of the Network's executive committee are listed, and the Network's aims and objectives are outlined. (DB)

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Editors
C. Engel, H. Schmidt, P. Vluggen

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The Annals of Community-Oriented Education publish original investigations and descriptive or theoretical papers dealing with aspects of community-oriented, health-professions education. The Editors maintain a liberal policy concerning the nature of the subjects to be addressed. The Annals aim to encourage the study of instructional practices, approaches to student assessment and curricular aspects specific to this domain. In addition, papers addressing the broader issue of health care research will also be considered to the extent that they provide directions relevant for health professions education. The editors in particular welcome contributions from investigators who are new to the field. The editors see as one of their objectives to help authors improve their contribution, provided the subject is of interest to a broad audience and the study is methodologically sound.

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Editors
C. Engel, H. Schmidt, P. Vluggen

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Editorial

As behoves the annual publication of the Network which supports community-oriented education, the first section of this Volume presents twelve papers that focus on this topic. We have attempted to group these papers for the convenience of the reader. Thus, the Eleven Steps by Magzoub and colleagues and the Model of Experiential Community-based Education by Jinadu represent important contributions towards the development of a more structured approach and an underpinning philosophy. This is balanced by Magzoub exploring the problem of Network graduates in the face of health systems that positively discourage the practice of what they have learned. Omotara and colleagues expand this view of the real world with an extensive evaluation of attitudes towards rural posting and specialty preferences.

The next three reports on experiences form Nigerian universities are followed by a further paper on how staff from a well established school assist a new medical school in planning a careful preparation of staff, students, authorities and community leaders for the community-based experience. By contract, the paper by Landis and colleagues reports a North American programme for exposing students to community-oriented care. Christiansen and colleagues, also in North America, show how community-based education can be planned, organised and implemented by practitioners in the community.

This section of the **Annals** reaches a high point, as it were, with a further paper by Magzoub in which he demonstrates triumphantly just how effectively a medical school in Sudan can affect change in the local health system, so that it really does provide opportunities for promotive and preventive, as well as curative care. This, too, is the message of the last paper which reports on a special course for district medical officers in Senegal.

The next ten papers concentrate on **evaluation**. The editors have followed the advice of a member of the editorial board that reporting on aims, goals, objectives and curricula might change towards more robust exploration of methods and outcomes. The **Annals** are indeed fortunate to have attracted the collaboration of a veritable galaxy of experienced colleagues. It may not be too far fetched to anticipate that this collection of papers will become the reference point for a growing volume of research and investigations into what we plan, what we execute and what we achieve in the education of health professionals. The paper by Mennin and his colleagues and the paper by Rotem range over a number of issues that set the scene, as it were. Graham and Kings open up a vista that offers a far reaching challenge to those who see evaluation as an essential means towards bringing change about.

Bandaranyake with his colleagues reports on a multidimensional approach to the evaluation of change from a five year to a six year curriculum in a well established medical school in Australia. Charting the Winds of Change is reproduced here, as it is almost certainly the most substantial paper from the 1980s on evaluating innovative curricula. This paper is followed by thoughtful up to date reflections on the same theme by Woodward in Canada. The next two papers from the Netherlands by Schmidt and colleagues and by Majoor respectively represent outstanding examples of open and unequivocal reporting. Both papers will render valuable service in stimulating debate on how problem-based learning can be made even more acceptable and effective by ensuring that the wider educational environment is truly supportive in the overall context of helping late adolescent lay men and women to mature into young adult professionals.

The last two papers in this section relate to the evaluation of teachers. The literature review by Wakefield and her colleagues identified one paper only that reported on the evaluation of problem-based, small group tutors. However, the authors were able to validate their own instrument against information from colleagues at other like minded schools in North America. The paper by Zhivkova, by contrast, sets out to establish staff and student originated criteria for evaluation of conventional lecturers
in a traditional system.

The section on **innovation and change** includes three important papers that might well have deserved pride of place at the very beginning of this Volume. From New Zealand the **Annals** are fortunate to be able to print the well documented account by Lewis and her colleagues of how a traditional clinical course was progressively changed into a problem-based course. In addition, be it noted, these busy clinicals found time and energy to satisfy their intellectual curiosity to find out the extent to which the new way of learning affected the learning style of the students. Des Marchais and his two colleagues have given us one more important paper from Canada, how Sherbrooke extended its educational revolution throughout its clinical curriculum. Notable are the philosophy on which the change has been based and the sensibility which has supported the staff in achieving the change. The third paper comes from Great Britain, where Towle illustrates how a charitable trust uses its neutral credibility and materially assists in changing a climate of opinion - an essential prerequisite for change of any real magnitude. The fourth paper by Hartono and colleagues reports an introductory course to the clinical years, with emphasis on role play and experiential learning.

Problem-based learning specifically is represented by two explicit contributions. Snellen-Balendong has given us an interesting insight into the Maastricht tutorial approach and the materials used for this experience. Eagle and colleagues have investigated what students identify as their learning goals during such tutorial sessions. These authors have compared the students' own learning issues with those intended by the author of the learning problem. The paper illustrates just how much remains to be explored about the process of problem-based learning.

Administration of education, the last section, is an aspect that tends to attract less attention than it deserves. We are, therefore, very fortunate to be able to publish the account by Areskog and his colleagues of their three year experimental programme of student selection in Sweden. Norman has contributed the last and equally important paper which presents cogent arguments for placing the responsibility for active planning and experimentation in medical education in the hands of the academic staff, rather than relying on a unit of expert educationalists.

As in the past, this Volume too concludes with information about recent publications and a selection of abstracts from the literature. Let the inordinate length of this editorial be justified by the extraordinary wealth of the contributions which the Annals has been privileged to publish for the benefit of the membership and for the growing number of readers in institutions which are not yet part of the Network.

The Editors

Annals of Community-Oriented Education
1992, Vol. 5, 11-17

COMMUNITY-ORIENTED EDUCATION

Eleven Steps of Community-Based Education at Gezira Medical School

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Abstract

This paper suggests clear steps in community-based learning (CBL) as in problem-based learning. These steps follow the management cycle or problem solving cycle. The steps include selection of a community unit, identification of investigation tools, data collection, analysis, listing of problems, prioritisation of problems, plan of action, implementation of the plan, follow up, evaluation and reporting. The features of these steps and how they are applied by the Gezira Medical School are discussed.

Introduction

A major objective of medical schools is to prepare their students to resolve the problems of their communities at the level of individuals, families and the community. In addition, the students have to be prepared to continue their education following graduation to become life long learners. The realization of these goals has been the subject of numerous initiatives and innovations. Now many innovative schools follow the clear steps of problem-based learning as described in the nine steps (Schmidt, 1983). There is a need to create similarly clear steps for community-based learning (CBL).

Community-oriented medical education (COME) is defined as "education which is focused on population groups and individual persons taking into account the health needs of the community concerned" (Network of Community-Oriented Educational Institutions for Health Sciences, First Meeting, 1979). Community-based education "is the means by which COME can be achieved". Community-Based Learning "is the specific learning activities in community settings" (Hamad, 1991). From these definitions we conclude that CBL is learning activities that use individuals, families and communities as units for learning. Our steps in CBL exclude individuals because here the problem solving or problem-based strategies are applied. However, the aggregate data of individuals attending primary health units, for instance, will constitute a major resource in our steps for CBL. Our focus is thus on CBL using groups of individuals in primary health units, families and communities. Care of these groups calls for special competences that students have to acquire, in order to become community-oriented problem solvers.

Request for reprints should be sent to Mohi Eldin M.A. Magzoub, University of Gezira, Faculty of Medicine, P.O.B. 20, Wad Medani, Sudan.

The Need for Clear Steps in CBL

As more educational institutions come to adopt CBL as a main educational strategy, clear steps will facilitate the sharing of experiences which will in turn be reflected in the further development and progress of CBL. Many institutions involved in CBL have similar community-based programmes e.g.. Gezira, Suez Canal, Ilorin, Aga Khan Universities. This will make it easier to agree on uniform steps in CBL. One of the criticism of COME and CBL is that they are based on "soft science" and not on "scientific grounds" (Hamad, 1982). The defining of these steps may help in conceptualising CBL in a uniform framework which may contribute to making CBL more scientifically based. Specifying the steps will define students' learning objectives which should facilitate teaching and learning activities and contribute to more objective assessment of students and evaluation of programmes.

Main Features of the Proposed Steps

These steps follow the management cycle or problem solving approach, where students progress through different stages, including planning, implementation and evaluation. The students are exposed to real and practical community field experiences. In contrast to problem-based learning in the class room, with its heavy reliance on written and simulated problems, the students are offered the chance of real life exposure to community problems and to apply their knowledge and skills. As community participation is an integral part of the educational process, it is not specified as a separate step. Most of the steps are followed by provisional report writing; however the final report is listed as the final step as important in its own right and because it includes many learning objectives. An important feature of these steps is that it is not always essential to go through all the steps for every problem. Selection of steps and their sequences could be adapted according to the available resources, time and programme objectives.

Step One. Selection of Community Units (Family or Community)

In most instances the selection is the responsibility of the Medical School. This selection is determined by logistics, access to transport, programme objectives and the willingness of the community to accept students and to participate actively in the programme. A variety of community units will be selected in terms of development, size, ethnic and geographical background, so that the students can share experiences between and within different groups. At this stage the learning objectives include introduction to community and family structure and function, and the impact on the health of individuals, the importance of a multidisciplinary approach and inter-sectorial collaboration in health.

Step Two. Identification of Investigation Tools

The students are expected to identify and design all the tools of investigation for collecting data from the community units. Students work independently in small groups under the supervision of staff members. The learning objectives here are to recognize, apply and evaluate the strength and weaknesses of each instrument, and the data collection which may include questionnaires, direct interviews with community leaders, and observations. Also at this stage the students will have the chance to use and advance their knowledge of sampling procedures and of the conduct of surveys.

Step Three. Collection of Data

The students collect data from their community units during one or several visits. The students will be offered the chance to take full responsibility in approaching the community leaders and arranging their stay in the community. The learning objectives are: to be able to administer the data collection instruments, to use and develop their knowledge and skills in communication, how to make use of community participation and to become acquainted with rural life and the difficulties and constraints associated with projects in the field.

Step Four. Analysis of Information

At this stage the students come to the university campus to analyze and interpret the data they have collected. They work individually or in small groups with the assistance of their tutors, the library and senior peers. By the end of this step the students are expected to be able to recognise all the stages of data processing which include coding, entry, cleaning, manipulation, analysis and presentation. The students will also have the opportunity of applying their knowledge of statistics and to learn more about statistical procedures. The students are introduced to the use of computers in data analysis.

Step Five. Listing the Problems

The students are asked to list the problems and classify them in a presentable format, e.g. according to problems of health status, health service problems and community problems. The learning objectives are: to recognise basic feature of a problem, problem classification and presentation.

Step Six. Prioritisation of Problems

The students list the problems in order of priority and follow their priority problem through the subsequent steps. Also at this stage the students include in their report general recommendations about all the problems according to their findings. The criteria for selecting a priority problem may include frequency, seriousness, preventability and the community's perception of the problem. Our experience has shown that the most important criterion is the community's perception of the problem. This encourages active community participation and thus the proper implementation of the intervention.

Step Seven. Plan of Action

The students write a detailed plan of action for the resolution of the problem. During this process the students will be helped by their tutors. The plan will be taken to the community for discussion and final approval. With the help of the community, the students will approach funding agencies to finance their suggested interventions. The learning objectives here are: how to write a project proposal including objectives, strategies, implementation planning, follow up and evaluation. How to approach funding agencies.

Step Eight. Implementation of the Plan
This is the implementation of the suggested plan of action, with as much participation by, and financial support as possible from the community. This is the only way to ensure sustainability of the project. Here the students will learn implementation with a real experience of working with villagers through their participation.

Step Nine. Follow-up
Students follow their project up on a regular basis, either through regular visits or meeting community leaders during their visits to the town. Students use a checklist to follow their activities. The learning objectives are: to acquaint students with the importance of supervision and supervisory skills. The results of supervision will be used for decision making and evaluation.

Step Ten. Evaluation
This is where the students evaluate their project by using different evaluation tools to determine the degree of achievement of the objectives of the project. The learning objectives here are: to recognise and apply different tools of evaluation, assess the advantages and disadvantages of these tools, and use the results of evaluation to inform decision making.

Step Eleven. Reporting
Reporting may accompany all the above steps. However, the final report is the most important one. Here, the students describe the whole process including all the steps. This report will be discussed with the community. During this step the students learn how to write a scientific report.

Application of these Steps at Gezira

These steps are applied gradually and built on throughout the undergraduate course. Application starts in the first introductory part of the curriculum, the introduction to medicine course. Here the students are given community problems and asked to analyze them by using existing records, making visits, and conducting simple interviews. This exercise includes Steps 1 to 7. Subsequently the students experience all the steps in depth under close supervision by the staff. This fits in with the interdisciplinary field training research, rural development and the family health courses. Later on the students have more autonomy and responsibility and less support from the staff. Here the students are left free to choose the community units themselves and tailor the steps and sequence to the problem which they have selected. This is part of the rural residency course.

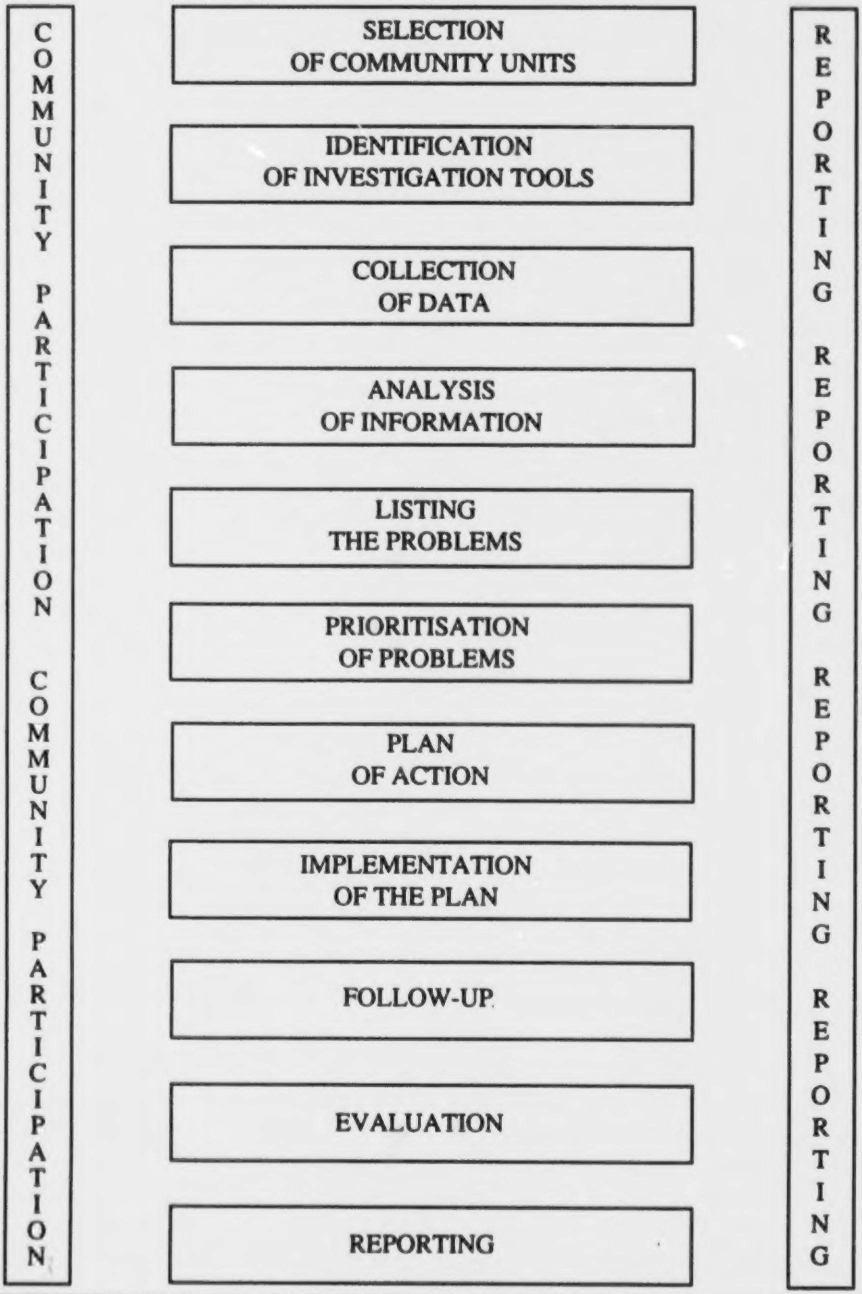
COMMUNITY PARTICIPATION COMMUNITY PARTICIPATION
SELECTION OF COMMUNITY UNITS
IDENTIFICATION OF INVESTIGATION TOOLS
COLLECTION OF DATA
ANALYSIS OF INFORMATION
LISTING THE PROBLEMS
PRIORITISATION OF PROBLEMS
PLAN OF ACTION
IMPLEMENTATION OF THE PLAN
FOLLOW-UP
EVALUATION
REPORTING
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Figure 1.The eleven steps of community-based education as applied in Gezira medical school

An Example

We are a group of four students. Abbara village was selected for us during the summer field training. Our first task was to identify problems in this village. We decided to collect the data through a structured questionnaire, interviews with community leaders, and an observation checklist. These tools were developed with the help of our tutors, senior colleagues and colleagues from the Faculties of Agriculture and Economics. It took us one week to develop these tools. It was hard work but it was interesting. We used public transport to reach the village. In the bus we met many people from the village, who introduced us to the Sheikh, the village chief. We had a warm welcome from the Sheikh, he asked his son and one of the few educated ladies to be our guide during our one week stay in the village. We lived in the Sheikh's house which was a wonderful experience. We accomplished the task of data collection successfully. We returned to the University main campus for data analysis and listed all health and health related problems of the village. The findings were discussed with our tutors, colleagues and the community leaders. With the criteria for prioritizing problems we selected childhood diarrhoea as our priority problem. In the second phase of our community-based education we chose a latrine construction programme as an intervention to address this priority problem. The objective was to increase the availability of latrines by 30% in one year. We submitted a joint project with the village health committee to the Blue Nile Health Project. They agreed to provide slabs for any completed four meter depth latrine. Our role was to encourage families to dig their four meter pit. It was difficult to convince families to change their behaviour, i.e. not to get rid of their excreta in the open air. Through time and personal contact we convinced the Sheikh to make a start. In far less time than we had expected our target was achieved, and the programme was evaluated in the last phase. There was a significant reduction in the incidence of diarrhoea when compared with the base line data. During the presentation of our work, we were criticised, as the reduction of diarrhoea incidence might not have been due to our intervention. It might have been the result of other factors which we had not controlled, including improved socioeconomic status and water supply. At first this was a disappointing comment but it has stimulated us to read more about study design and the control of confounding variables. We concluded that we could not be sure that the reduction was due to our intervention. What we can be sure about is that the community and we ourselves were satisfied with our inputs, and we learned a lot from this experience.

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Model of Experiential Community-Based Education for Health Care Professionals: Implications for Developing Countries

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Abstract

The relevance of traditional education of health professionals to the essential health needs of the community has been a subject of intensive debate world-wide. Experiential community-based education is a unique way of educating health professionals towards achieving this relevance. This model requires active gathering of information necessary to solve community health problems, encourages initiative, responsibility, cooperation, exploration and independent learning. Experience in the application of the model to PHC education at the Ife Medical school is discussed. The paper concludes by highlighting the implications of the model for PHC education in developing countries.

Introduction

Over the past two decades there has been a tremendous increase in the number of health workers trained in Africa. For example, between 1979 to 1986 approximately 21,900 community health workers were trained exclusively for the primary health care (PHC) programme of Nigeria (Jinadu et al., 1990). A considerable number of physicians and nurses have also been trained. Despite this heavy infusion of manpower into the health care delivery system of Nigeria and other African countriesn there has been no corresponding improvement in the health status of the people. Infant and maternal mortality rates remained unacceptably high - approximately 120/1000 live births and 16/1000 deliveries respectively (United Nations Children's Fund, 1988). Diseases, such as malnutrition and infections, which can be controlled or eradicated through PHC programmes and strategies were the major causes of high morbidity and mortality in Africa (United Nations Children's Fund, 1988; Daramola, 1978).

In the past, training programmes in Africa produced doctors and nurses who could serve effectively only within tertiary and secondary care institutions, leaving the PHC level unserved or underserved.

Basic medical and nursing education in African countries was patterned on the British model which was entirely hospital-based. It also developed its power base in hospital and

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medical school establishments where clinicians were the high status group. The growth of hospital medicine led to increased specialisation and sub-specialisation, and, consequently, to fragmentation and lack of coordination of care among the health professionals (Jinadu, In press).

Following growing criticism of this medical education in Nigeria and the West African sub-region, the Nigerian Medical Education Working Party made a number of observations and recommendations in 1977 for the improvement of medical education in Nigeria. The Working Party recognised the need to make the education of doctors and other health professionals relevant to the needs of the population. A chapter of the report was, therefore, devoted to the Federal Government Health Policy of the Third Development Plan, known as the Basic Health Scheme, and the working Party recommended "a rural posting, in order to enable students to render community service" and "study the totality of the patient in his environment" (Fagin, 1978).

Community-Based Education

One of the main objectives of nearly all the medical schools in Nigeria was to train doctors with a strong inclination towards broad community care and preventive medicine. However, how this laudable educational objective should be achieved has not been adequately specified by nearly all the schools. Experience has shown that in some medical schools, planning, implementation and even evaluation of this aspect of the educational programme have tended to be haphazard, uncoordinated and ineffective. This has resulted in poor student motivation to achieve the objectives of community-based care, especially in the area of PHC programmes.

Health is a total community process and the whole community structure must, therefore, be considered when dealing with health problems. PHC programmes and approaches are based on this premise. Effectively organized PHC orientated educational programmes for students should serve as a major factor for increasing the interest of students in PHC (Medical Education Working Party, 1977; Richards, 1986).

Community-based education should be problem-based and student-focused (Medical Education Working Party, 1977; Schmidt et al., 1987). The problem-based, self-directed learning approaches are based on the premise that when students are presented with real life health problems, especially in the community, rather than the bits and pieces of fact-learning, they are highly motivated to acquiring the skills necessary for solving the problems (Coles, 1985).

Model of Experiential Learning

A model of an experiential programme represents a unique approach for achieving the objectives of PHC education for health professionals. The model presents us with a rational and systematic approach to community-based education. The focus of the model is on learning rather than teaching and training. In the model learning experience are conciously and systematically organised for active participation of the students in the tasks that are to be mastered. The teacher's major role is to select appropriate learning experiences for the development of problem-solving skills, attitudes and interest for the achievement of the predetermined objectives.

Table I contrasts traditional health professional education with the experiential model for: a) sources of information available for learning; b) the learning environment; c) the role of teachers; and d) the approach of the students to learning.

Table I. Comparison of conventional and experiential community-based education

Conventional Model		**Experiential Model**
	a) **Sources of information**	
Authoritative source of information i.e. lecturers and textbooks		Observation and enquiry
	b) **Learning environment**	
Learning takes place in designated settings, e.g. lecture rooms		Learning takes place in the entire social environment
	c) **Role of teachers**	
Use of deductive and directive learning process		Use of inductive, non-directive learning process
	d) **Approach to learning**	
Surface and strategic approach		Deep level approach

Information for active learning in the community-based, experiential model is gathered by observation of the socio-cultural environment of the community, rather than by reliance on books and lectures.

Learning, therefore, takes place in the entire social environment of the community as opposed to lecture rooms. The student is continuously exposed to circumstances that demand that he should adequately diagnose the situation, devise appropriate solutions and carry out remedial actions.

Health projects in the community should, therefore, provide students with adequate exposure to the learning environment as a starting point to problem-solving. Information required for solving a community's health problems are gathered during this process.

In the experiential model, the role of the teachers is to help the students to think and work out problems for themselves using their own initiative. The teachers aid the students in an inductive learning process rather than the traditional deductive process (Medical Education Working Party, 1977). The model encourages the students to explore the meaning of what they encounter in the environment and, therefore, team work with other health professionals is also encouraged.

PHC Education of Ife Medical Students

The Faculty of Health Sciences of Ife University admitted its first medical students in 1972. The institutional objectives of the Faculty include a clear commitment to train health professionals with a strong bias towards PHC. The Community Health Department of the Faculty of Health Sciences and its teaching hospital is mainly responsible for the PHC education of the Ife medical students. However, other members of the University, not only from the health sciences, but also from social sciences, education, and agriculture participate in this educational programme. The PHC programmes are based on health centres scattered throughout the Faculty's catchment area, which consist of about 500 villages and two towns. Specific PHC-focused educational objectives that relate to the experiential model are: a) to orientate the students to community health problems of rural inhabitants; b) to enable the students to learn and put into practice the basic principles of community health diagnosis; c)to enable the students to initiate, plan, implement and evaluate programmes and activities for solving community health problems; and d) to develop team spirit for community health practice and PHC among the students.

The students participate repeatedly in community based PHC activities during the preclinical and clinical years of their medical education (Table II). For example, during the preclinical years the students carry out field work related to community assessment. This includes basic demographic and environmental surveys of the community. During the clinical years, the students rotate through health centres, where they are involved in various PHC programmes, carry out problem-solving research activities, and plan, conduct and evaluate interventional programmes. After some introductory lectures on the basic scientific principles of community health and PHC practice, they are encouraged to learn on their own.

Assessment of Student Performance and Evaluation of Programmes

Assessment of the students in this programme includes:

1. Assessment of the project report during seminar presentations and by independent assessors.
2. In course and end of the course examinations.
3. Attitudinal assessment of the students by their supervisors.
4. Assessment of the degree of participation of the students by their supervisors.

Each assessment is carefully weighted and scored to reflect the composite performance of the individual student. One of the most difficult aspects to assess objectively is each

Table II. Community-based education for Ife medical students

Year	Duration	Activities	Location and organisation
Year II (Preclinical)	4 weeks Block posting	Demographic survey of a community: design survey instrument, map out the community, conduct the survey and write report	Communities (urban and rural). Students are divided into small groups. Each group works in a village or community of about 5000 inhabitants.
Year IV (Clinical)	6 weeks	Survey of specific health problems or programmes, community diagnosis.	Communities/health centres. Group and individual activities.
Year VI (Final year)	8 weeks Block posting	Disease-oriented survey; planning and conducting intervention programmes.	Health centres/communities. Individual or group survey.

student's contribution to a group project. We combined individual scores, obtained during seminar presentation of the project report, with the supervisors' scores, based on observation of the students during the project.

Our approach to the evaluation of the model consists of end of posting review by the students and an annual departmental review of the programmes. During the students' evaluation excercise, various aspects of the programmes are criticised by the students, and their criticisms are always taken into account during the review of the programmes. The annual review includes other members of the Faculty and University with shared interests in the programmes. The staff of the health centres, particularly the community health nurses, are especially welcome at the review, because they can give a clear picture of their community's perceptions of the students' programmes.

Our experience shows that the model is widely accepted by students, academics and the community. The students have always been very enthusiastic to learn during their community-based activities, once their learning objectives were made explicit to them. Some academics were initially sceptical about the effectiveness of the model for the achievement of the objectives of community health education. They believed that certain subjects had to be taught in-depth in the classroom - the conventional model - before they could be experienced. Experience with the experiential model has convinced them of its effectiveness. Adequate implementation of this model requires considerable input of resources in terms of transport, accommodation, time and effort. Vehicles are needed to transport students and staff to and from the communities. Where the communities are far from the Faculty, accommodation has to be provided for the students and their supervisors. A great deal of time and effort have to be devoted to the supervision of the students by members of the Faculty. Members of the community are positive in their attitude towards the students and their activities in the community. Adequate care has always been taken to introduce the students properly to the communities, and the students are frequently seen providing services at the health centres.

Conclusions

In the absence of elaborate PHC facilities and programmes, especially in rural area, communities in developing countries should serve as a practice areas for PHC education of health professionals. Adequately planned and implemented community-based educational activities for the students require earlier clinical contact than is currently the practice in most educational institutions. The experiential model presented in this paper will provide the basis for developing skills in integration of knowledgde during the community-based activities and, therefore, help to avoid some of the pedagogical issues currently faced by medical education. Effective operation of the model will ensure that students do not disregard the PHC aspects of their curriculum.

Behavioural objectives for the students as well as methods for student assessment should be well set out at the planning stage.

Planning and implementation of the community-based educational programme should be a multidisciplinary activity, involving teachers not only from basic medical and clinical sciences but also from social, agricultural and educational sciences. Adequate planning of learning experiences based on the model will require sequential organisation and integration of situations in which the students will encounter appropriate problems to solve.

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Problems facing Graduates from Network Institutions: Experience from Sudan

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Abstract

Graduates from the Gezira Medical School face many problems in the present health system. These problems include curative-orientated health care in both teaching hospitals and rural areas. Difficult working conditions which lead many graduates to emigrate. Postgraduate studies which are mainly adapted for international recognition rather than to meet real health needs. These problems make the present health system unattractive for Gezira graduates and hinder their contribution in applying the competences which they learned in the undergraduate community-based curriculum. These experiences and how graduates from Gezira attempt to influence the health system are discussed.

As a graduate from Gezira, a member of the Network, I am not only pleased but rather relieved to see the problems facing graduates as one of the top Network priorities for the next ten years. I think this issue is very vital and has to be considered seriously by the network schools if our schools are to play an influential role in the health services. We have to work jointly schools, graduates and ministries of health, to face this priority problem.

Although this is a personal experience it is true for most Gezira graduates and probably for graduates of other Network schools, based on interviews and discussions with colleagues from Gezira. We blame traditional schools for focusing on irrelevant knowledge. Yet the same accusation might be raised in our case, that we provide our graduates with competences which they are unlikely to be able to use in practice, in the present health system.

Graduates from Gezira Medical School receive temporary registration from the Sudan Medical Council and join the Ministry of Health as house officers (residents). In Sudan this appointment is for one year during which the doctor has to spend three months in each of four departments: obstetrics, medicine, surgery, and an optional rotation in another department. All medical specialties are offered, except primary health care and public health. Indicators for evaluation of performance by doctors are totally different from what is taught at Gezira. The criteria include how quickly a diagnosis is reached and, more importantly, demonstration of sufficient knowledge to undertake postgraduate studies at

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internationally recognised medical institutions. All young doctors compete for the opportunity to undertake postgraduate studies as soon as possible. The selection for postgraduate education is through a written examination in the clinical and basic sciences without regard to performance as a doctor. The fundamentals of training at Gezira are not at all relevant in such an environment. Community-based activities are viewed as soft sciences, as side issues, and sometimes as a waste of time and a job to be performed by lazy doctors who failed to join attractive specialties.

Another obstacle is the severe constraint imposed on quality of care by the shortage of doctors, where the house officer is involved in many responsibilities including working in the outpatient department. (where patients stand in long queues), admissions, and inpatient follow-up. These duties create severe time constraints and work overload. In such a situation it is not possible for the young doctor to practise all the problem-solving skills, especially when it comes to the underlying problems at family and community levels.

As new graduates we spent one year exclusively in big teaching hospitals without finding any real chance to practise the full range of competences we had learned in our medical school. By the end of the year we had succeeded in creating a name for our school, but according to their criteria and not ours. To give an example, during the drought we received a large number of displaced persons in the hospital. We suggested to the hospital authorities that an emergency clinic might be established at the camp to deal with all displaced persons at their camp. We were told that this was not our concern, that it was the job of somebody else in the public health office. We failed to do anything through the hospital. Eventually we made contacts through our school where we succeeded to involve students and established an emergency clinic to deal with the problems in the camp itself. Following our full registration by the Sudan Medical Council, many of us chose to work in rural hospitals. We thought that this would suit our training and the skills and knowledge we had acquired. To our surprise the situation in the rural hospitals was little better than in the teaching hospital. The health services were rendered independently through vertical programmes. The primary health units in the area were not under the supervision of the rural hospital. They were supervised by the district inspector, located at the district headquarters. He had no time or facilities to supervise all the primary units in the district, usually more than 100 units. This left the primary health units isolated and with many unresolved problems. Moreover, the financial and administrative responsibilities of the primary health units belonged to the local government councils, while the hospital remained under the Ministry of Health. This created a dichotomy in health services delivery. The community expectation of doctors is that they will apply high clinical skills and decide on few referrals, they are not expected to work in Primary Health Care and community based activities.
The author was asked to work in a rural hospital in Eastern Gezira. Faced with all these difficulties, he organised a meeting with the community leaders to explain the importance of primary health care as a more appropriate way to face the health problems in the area.

He assured the leaders that this work would not be at the expense of his work at the hospital. It took a long time to convince the community. The author made contact with all the health workers in the area. Together with a colleague from Gezira, he started an integrated primary health care programme which included oral rehydration, nutrition and immunization. All the health workers in the area were trained in these interventions and followed this up with implementation. Evaluation demonstrated the success of the programme as measured by the health workers and through community feedback. Unfortunately, the programme was not strongly supported by Ministry of Health officials in the district and it could not operate within a supportive system; it was left to the enthusiasm of the doctor in charge. As was to be expected, the programme collapsed, due to the disinterest of the doctor in charge.

Another problem that faces all doctors in Sudan is low pay and difficult working conditions. This leads to severe drainage of doctors to the petrol rich countries in the Persian Gulf. Graduates from Gezira are not immune from these problems, and it is not surprising to find more than half the doctors of the first cohort have emigrated to Saudi Arabia.

The existing postgraduate study programmes are mainly run by traditional medical schools with their own learning strategies and priorities. These programmes, imported from British institutions, are mainly adapted towards international recognition, rather than meeting community needs and local realities. There is no option for the Gezira graduate but to join these programmes with their own focus and orientation, which are very different from the graduates' basic training at Gezira.

What is the Way out?

The most important start for the Medical School is to play an influential role in the health services to ensure that the competences of its graduates are used appropriately. The Gezira experience will serve as an example.

a. Health Area Policy

As a result of meetings and discussions with the Ministry of Health an area health policy was developed. The aim of this policy was to deliver an integrated primary health care service led by the rural hospitals. Leadership was assumed by a health area management team (HAMT), headed by the doctor and including all Ministry of Health Departments, in addition to the related sectors. The team would be responsible for administration of the entire health services and personnel in the area for planning, implementation and evaluation of all health activities. The team would take charge of logistic support and drug delivery to all primary health units in the area. It would be responsible for the integration of all services, including vertical programmes. It would seek active community participation where necessary. It was hoped that this system would solve the problems of the dichotomy in health services delivery in rural areas and provide a healthy environment and hence attract Gezira graduates to play an influential role in the system.

b. PHC Management Course

This policy created a need for trained leaders to guide and manage health areas. Responding to this need the Gezira Medical School has organised a three week PHC management course for doctors prior to their enrolment in rural hospitals. The objective of this course was to prepare the doctor to perform the tasks of the health area management team leader. The methods of training followed the learning strategies of the Gezira Medical School, including problem-based and community-based learning. The course has been run 17 times and has trained 420 participants so far. The training has had a magnificent impact on improving the quality of services at the rural hospitals as witnessed by its evaluation through site follow up visits. Moreover, the evaluation reports have shown that this training has demonstrated changes in the doctors' attitudes towards primary and rural health care.

c. Influence of Gezira

This course has shown that a medical school is able to play a very effective role in attracting to its philosophy doctors who are leaders of health services.. This, in turns, may influence the health services. The increasing number of doctors who are choosing public health for their postgraduate studies is attributed by Ministry of Health officials, among other reasons, to the influence of the Gezira course and the influence of Gezira graduates.

The Gezira Medical School has started to influence the health services through its graduates who have taken leading positions in the Ministry of Health. One example is a graduate who is now working as an acting director of the National Control of Diarrhoeal Disease (CDD), a very important department in the Ministry. He caused quite a revolution in the CDD short training courses for doctors and other health workers by incorporating problem-based and community-based learning in these courses. That programme has also moved more towards community participation and involvement which had been neglected in the past.

d. National House Officer Induction Course

The Gezira Medical School, in collaboration with the Ministry of Health, has organised a one week orientation course for all new graduates in Sudan before they join the Ministry of Health as house officers. This one week course covers primary health care, management and hospital administration. The learning and teaching strategies follow the Gezira curriculum. These short courses have proved that the school can play an important role through training of large numbers of young doctors who are potential leaders of health services in the near future.

In conclusion the problems facing graduates of innovative schools of medical education are numerous and may inhibit the influence of these schools through their graduates in the health system. Fortunately the members of the Network are aware of the problem, and several innovative institutions have started to influence the health system.

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Attitude to Community-Based Rural Posting and Specialty Preference

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Abstract

This prospective study is based on a questionnaire (Appendix) to six consecutive years of final year medical students (1986-1991) after they had returned from the 8 week community-based rural posting. The aim of the study was to assess the attitude of final year medical students to the rural posting and to explore the dynamics of specialty choice as a result of the posting. A total of 175 final year medical students were involved in the study consisting of 160 males and 15 females. Mean age was 25.5 years ranging from 21 to 35 years.

Result of the study showed that 54.7% of the students had decided on a specialty before their exposure to the rural posting, 16.6% changed their previous choice of specialty as a result of the posting, with slightly more than half of these changes (51.8%) in favour of Community Medicine. Of those who had not made a specialty decision before the posting 13.6% reached a decision during or after the posting, and 44.4% of them decided to specialise in Community Medicine. Only one of the fifteen females decided on a specialty as the result of the posting, 7 did not make any decision before and after the posting, while 7 had made decision before the posting and did not change their decision after the posting.

72% of the students indicated that more than 80% of their expectations were met during the end of the posting, while 28% indicated otherwise. All the students indicated that the rural posting changed their attitude favourably towards the practice of Community Medicine.

Introduction

The College of Medical Sciences, University of Maiduguri was established with the aim of producing competent doctors. The College was established in 1978, three years after the establishment of the University. The University was established purposely to provide qualified personnel for the then North Eastern part of Nigeria which now consists of five states; Borno, Yobe, Adamawa, Taraba and Bauchi. Before its establishment, this area benefited from graduates from Ahmadu Bello University, Zaria which is some 800 kilometres away from Maiduguri.

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Although the new College had made provision for rural posting in its curriculum, this posting was not immediately implemented because of logistic problems. Consequently the first three cohorts of medical students graduated from the medical school without undergoing the rural posting. Instead, they undertook individual projects, though most of them were not community-based. In 1986, Song Local Government Area of Adamawa State, one of the University catchment areas was chosen for the 8 week community-based medical education programme. Because of the long distance from Maiduguri (approximately 400 kilometres) and the shortage of staff in the Department of Community Medicine, it became impossible to continue to use Song Local Government for the rural posting after the second set of students in 1987. In 1988 arrangements were made with three other local government areas, Konduga, Bama and Gwoza. This arrangement was not implemented until 1989 and only in Konduga, the closest of the three Areas. From 1990 the posting in the three local government areas became fully operational. Gwoza, farther away, is only 150 kilometres from Maiduguri, so that Faculty staff could make daily trips for supervision when necessary, while the students were resident in the local government area.

Prior to the eight week rural posting*, the medical students would have undertaken a six week non-residential community-based posting. This posting would normally come in the middle of the fourth year or second clinical year. The main purpose is to enable the students to acquire skills in data collection, analysis, and sampling and to appreciate the problems inherent in these procedures. The students are also introduced to school health services, and conduct visits to health related establishments, industries, both private and public. Reports of the visits are written and presented at the end of the posting.

The subsequent eight week rural posting is designed to serve two purposes. It enables students to carry out rural community projects which they write up and present at the end of the posting. The students also provide clinical services in the rural health centres under the supervision of a medical officer. By the time they go to the rural posting, the students have completed their junior, intermediate and senior obstetrics and gynaecology and paediatrics experiences, as well as unior and intermediate medicine and surgery. The have also completed their laboratory medicine. It is hoped, therefore, that, by the end of the community-based rural posting the students will have appreciated the nature of their chosen profession, as well as acquired skills necessary to tackle health problems in the rural areas in which more than 70% of Nigeria's population resides.

The purpose of this study was to assess the attitude of final year medical students toward the eight week rural posting and to determine how much exposure it gave them to the various specialties in the field of medicine, so as to enable them make a decision on a specialty.

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* See the paper on Community-Based Medical Education: The University of Maiduguri Experience" in this Volume of the Annals.

Method

A 13 item semi-structured questionnaire (Appendix) was administered. The first part sought demographic information about the students. The second part concentrated on information about the adequacy of the posting, aspects covered, adequacy of exposure to all specialties in medicine, how much of the students' expectation was met, problems encountered, and whether formal lectures should be continued during the posting. The questionnaire was administered immediately after completion of the rural posting. Six cohorts of students were involved in the study (1986-91), with 160 male and 15 female students. The questionnaires were collected immediately after completion.

Results

Table I shows the age and sex distribution of the 175 students who participated in the study. The total population of the students consisted of 160 males and 15 females, with an age range of 21-32 years and a mean age of 25.5 years.

Table I. Demographic information

Age Group	Frequency (%)
20-24	66 (37.7)
25-29	102 (58.3)
30-35	7 (4.0)

Male-160, female-15 students. Age Range 21-32 years, mean age 25.5 years.

Table II summarizes the responses of the students' attitude to the rural posting. Most of the students (83.4%) agreed that the period of eight weeks was adequate for the posting. A majority (73.3%) felt they would like to be exposed to more than one local government area during the period of the eight weeks. A majority (86.9%) agreed that formal lectures or seminars should not be given during this posting. Many of the students agreed to have been adequately exposed to the specialties of paediatrics, medicine, and obstetrics and gynaecology, in that order; while exposure to surgery, and basic laboratory sciences was judged to have been inadequate. All the students agreed that the posting changed their attitude towards community medicine favourably.

Table III indicates the areas where students encountered difficulties during their rural posting. The most problematic were transportation to their respective health centres and communities when they could not be accommodated within walking distance; and attitudes of the people. The most favourable areas were the attitude of the health workers and local government officials.

Table II. Summary of responses - rural posting and exposure to specialties

Aspect	Response			
	Yes (%)		No (%)	
Adequacy of the period of rural posting	146	(83.4)	29	(16.6)
Restriction of rural posting to a particular rural area	45	(25.7)	130	(74.3)
Formal lectures to be given during rural posting	32	(13.1)	152	(86.9)
Adequate exposure to Surgery during the period of rural posting	33	(18.9)	142	(81.1)
Adequate exposure to Medicine during the rural posting	129	(73.7)	46	(26.3)
Adequate exposure to Paediatrics	140	(80.0)	35	(20.0)
Adequate exposure to Obstetrics and Gynaecology	86	(49.1)	89	(50.9)
Adequate exposure to laboratory sciences	26	(14.9)	149	(85.1)
Changed attitude favourably toward community medicine	175	(100)	NA	NA

Table IV records the influence of the community-based rural posting on choice of specialty. Slightly more then half (53.7%) the students had already made a decision before the beginning of the rural posting; 29 (16.6%) changed their decision as a result of the posting, and 15 (51.8%) of these changes were in favour of community medicine. Eleven (13.6%) made their decision during or after the posting, and five decided on community medicine.

Table III. Difficulties experienced by students

Problems	**Least Problematic (%)**	**Most Problematic (%)**
Lack of adequate facilities	7 (4.0)	31 (17.7)
Catering	11 (6.3)	42 (24.0)
Transport	13 (7.4)	20 (11.4)
Reference materials	26 (14.9)	10 (5.7)
Attitudes of the people	7 (4.0)	42 (24.0)
Attitudes of other health workers	66 (37.7)	1 (0.6)
Attitudes of Local Government officials	36 (18.3)	16 (9.2)

Discussion

Studies of the attitude of medical students in Nigeria to the specialties of medicine and to rural medical practice have, in the past, suggested that factors other than medical school training influence or determine those choices (Erinoso, 1977; Brieger, 1979; Asuzu, 1989). For example, they showed that students, who grew up in rural communities, were more disposed towards rural practice and to primary care specialties than those who grew up in urban centres.

The results of the present study show that community-based medical education can have a considerable impact on the attitude of medical students, because it gives them the opportunity to understand what the practice of community medicine really entails. Elsewhere students tend to complain about the abstract nature of community medicine, as they relate it to facts and figures rather than to clinical practice. The change of attitude towards community medicine that can be brought about by the exposure of students to a community-based rural posting is very significant in the sense that more than 70 per cent of Nigeria's population reside in rural areas, and it is more likely than not that many young graduates will find themselves in rural practice. The fact that the rural posting initiated a change of decision by those who had previously decided on another specialty is of significant importance. Omotara et al., 1991) in a study of the dynamics of career and specialty choice with the same set of students showed that job satisfaction was one of the major factors influencing career choice and that further interesting experience/exposure in a new specialty was a major factor influencing change from a previous choice of specialty. The results from the study coroborated this conclusion, as further exposure to the practice of community medicine initiated a change from a previous choice to community medicine. In the same study, unpleasant experiences/hazards in the previously elected specialty were the most important factor responsible for change from that specialty. In the present study no student decided to change from community medicine to another specialty.

In addition, all the students who participated in this study indicated that their attitude to the practice of community medicine had been influenced more favourably by the eight week community-based rural posting.

Now that primary Health Care (PHC) is the main focus and thrust of Nigeria's health care delivery system, community-based medical education occupies a central position in the curricula of all medical schools in the country. Two of the older medical schools in Nigeria anticipated this need much earlier and established community-based rural posting where students are adequately exposed to health problems in rural areas. The first was established in Igbo-Ora by the University of Ibadan Medical School some three decades ago, and the other in Malumfashi by the Ahmadu Bello University a few years later. Most of the second generation medical schools have fashioned their curricula along the same lines. The lack of participation and involvement by the community, indicated in this study, could have been due primarily to the high level of illiteracy among the people of this area. In addition, religious practise in this area tend to militate against orthodox medical practice. Community involvement is one of the strategies of implementing PHC effectively. This study has, therefore, indicated the need to create a better awareness among the people of the local government areas, in order to achieve a sustained high level of community participation.

Transport is not controlled by the Medical School; the local government area health department is responsible for providing the students with transport from their residence to the health care facilities which, in some cases, are located far away on the outskirts of the villages. Students also rotate from one district to another, and in some cases these districts are located at extreme ends of the local government area. In some areas accessibility is a problem because some of the roads are not readily negotiable. Lack of sufficient numbers of 4-wheel drive vehicles to convey students and other health workers to these villages make effective health care difficult.

Conclusion

Overall, the results of this study show that the eight week community-based rural posting has improved the skills of medical students in the practice of community medicine. It has also changed their attitude favourably towards the specialty. However, there is a need for an effective way of improving the level of community involvement.

Table IV. Influence of community-based rural posting on choice of specialty

Options	Response (%)	n
Decided before exposure to the rural posting	94 (54.7%)	175
Changed decision as the result of the rural posting*	29 (16.6%)	175
Changed to community medicine(7 from Surgery, 3 from Obstetrics and Gynaecology, 1 from Pathology, 2 from Paediatrics, 2 from Medicine)	15 (51.8%)	29
Decided during or after the posting	11 (13.6%)	81
Decided to specialise in community medicine as a result of the posting (first specialty decision)	5 (44.4%)	11

* Direction of change:
7 from Surgery to Community Medicine
3 from O & G to Community Medicine
2 from Medicine to Community Medicine
2 from Paediatrics to Community Medicine
1 from Pathology to Community Medicine
4 from Surgery to Paediatrics
1 from Surgery to Medicine
5 changed their decision but did not specify the specialty.

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Appendix

Condensed Content of the Questionnaire on Perceptions and Career Choices.

1. Name : ....

2. Age : ....

3. Sex : ....

4. (a) Do you think that the period of eight weeks is adequate?
   (b) If No, how long do you think is adequate?

5. (a) Do you think a particular rural area should be used, at all time?
   (b) If No, how many areas do you suggest, and for how long in each area?

6. (a) Do you feel that formal lectures should be continued during the rural posting?
   (b) Give reasons:

7. How much knowledge of the following specialties were you exposed to during the rural posting.

8. How much of your expectations were met after the completion of the posting?
   1 Less than 40%
   2 Greater than 40% but less the 80%
   3 Greater than 80%

9. In which of the following areas did you encounter problems during the rural posting? (please rank according to their degree of problems, i.e. the most problematic as 1 and the next as 2 and so on).

   Adequate facilities
   Feeding
   Transportation
   Reference materials
   Attitudes of the people
   Attitudes of the health workers and staff of the various dispensaries
   Attitudes of government officials.

10. Has the rural posting changed your attitude towards Community Medicine in a favourable way?

11. (a) Did you make any decision on any specialty before the rural posting?
    (b) If yes, what specialty?

12. (a) Has the posting changed your decision?
    (b) If yes, what is your new decision.

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Community-Based Medical Education: The University of Maiduguri Experience

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Abstract

This paper discusses the Community-based Medical Education Programme of the University of Maiduguri since the inception of the programme in 1986. The programme has gained steady support from both the University and the three Local Government Areas involved. Some of the problems encountered include lack of participation from other medical school departments because of paucity of junior staff and consultants, also perhaps because the programme is based and coordinated in the Department of Community Medicine. Efforts are being made to secure input from these other departments as the staffing situation continues to improve. Changes in the logistics of making the programme Faculty-based are also underway.

Community participation remains a problem, although the programme enjoys a steady increase in the amount of community involvement. Efforts are being made to improve this further.

The programme has increased the motivation of students to want to work in rural areas after graduation. This is considered an important factor, as it is the main objective of the programme.

Introduction

The University of Maiduguri is located in the North Eastern part of Nigeria and was established in 1975 as part of the third generation of Universities. The College of Medical Sciences (CMS) was established three years later in 1978 to train doctors who could cater for the health care needs of the people of the area. The initial curriculum of the medical school was fashioned along the lines of those of Ahmadu Bello University (ABU) which is the nearest university with a Faculty of Medicine. The fact that most of the founding lecturers/consultants were from that institution also favoured the adoption of that curriculum.

Although community-based medical education (CBME) was to be part of the curriculum, this was not fully implemented until 1986, eight years after the establishment of the Medical School. The reasons were numerous, but most notably was the lack of infrastructure, personnel and facilities.

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Objective of CBME

The overall objective of CBME is to produce doctors of high quality in sufficient numbers to meet the health needs of the nation at community and hospital levels. The aim is to produce community-oriented doctors who are able and willing to serve their communities and deal effectively with health problems at primary, secondary and tertiary levels (Hamad, 1991). This objective is achieved by: 1) designing teaching and assessment to portray man as an integral part of his total environment; and 2) demonstrating to the students, through their involvement in community medicine practice, that adaptation to the environment can be carried out to benefit the health of the community. At the end of the medical training, the student is expected to demonstrate knowledge of the appropriate measures (promotive, preventive and curative) that can be used to identify and solve the health problems of individuals, families and communities. In addition, the students should be able to assess the health of a community and to plan, manage and evaluate health services for communities (Padonu, 1987).

Structure of CBME

The College of Medical Sciences, University of Maiduguri, organizes a total of 14 weeks of community-based medical posting which is split into two: six weeks and eight weeks, referred to as the junior and senior community medicine posting respectively. The junior posting in community medicine is a block posting where all the students are posted to the Department for a period of six weeks. This posting is usually held after intermediate medicine and surgery, and junior obstetrics and gynaecology and paediatrics. It is usually held in the middle of the second clinical year, just about one year before the senior posting. This junior posting is designed to develop the data collecting skill as well as to improve the students' ability to recognise the inherent problems associated with data from secondary sources, so as to appreciate the need for proper data recording.

It is a non-residential posting involving mainly urban activities. It also affords them the opportunity to make community diagnoses.

During this junior posting the students are engaged in data collection, collation and analysis, visits to important health related establishments, a school health programme and any other relevant exposure commensurate with their degree of training.

The visits to these selected establishments are included in the posting to afford the students the opportunity of appreciating the problems of various establishments involved in health policy formulation and implementation. Table I presents the various activities of the students during the six week CBME block posting. At the end of the posting students are graded on individual reports of the visits and on group reports of the data collection and analysis. The marks for the posting constitute part of the continuous assessment.

The eight week community-based rural posting is residential and is undertaken during the middle of the final year of the students' undergraduate education. The students will have completed their studies in obstetrics and gynaecology, paediatrics, laboratory medicine, and intermediate medicine and surgery. They will, therefore, have sufficient clinical

Table I. Activities during the first 6 week block posting of CBME

1986	Anthropometric measurement of nursery and pre-nursery children to monitor growth pattern. Visits to Water Board, Sanitation Board, Abattoir, Central Sewage Plant and Market.
1987	Anthropometric measurement of primary school children of University workers at Shehu Garba, mostly children of top income and civil servants, and at Gamboru, mostly children of low income earners. Collation and analysis of data. Visits as in 1986.
1988	Blood pressure measurement of workers of Nigerian Electrical Power Authority (NEPA). Collation, analysis and interpretation of the data. Visits as in 1986.
1989	Obtaining information from a secondary source; collection of morbidity and mortality records of childhood diseases from paediatric unit of the state the specialist hospital, collection, analysis and interpretation. Visits as in 1986.
1990	Prevalence of dispepsia in both urban and rural areas, with interviews and collection of blood samples. Results collected, analysed and interpreted. Visits as in 1986.
1991	Prevalence of asthma, based on the use of questionnaire and interview. Results collected, analysed and interpreted. Visits as in 1986.

training to be able to provide a service to the community. The purpose of this posting is two fold: to expose the students to health problems in rural areas; give them experience of the nature and extent of community-based medical practice; and to develop further their ability to carry out a community-based research project, usually geared towards establishing base line data for a community.

Preparation for CBME

Preparation for the programme usually begins in August when the students return from a four week vacation. During this period the principles of group dynamics are introduced to the students. They will then organize themselves into a designated number of groups. For the 35-45 students a group will consist of 6 to 8 students, and the total number of groups for a particular year may vary between six and ten. Each group elects its leader and is asked to submit two research topics in order of preference. If there is no conflict with other groups, the first choice of a research topic is usually assigned. In cases where a group has difficulty in making a choice, staff members will provide assistance, but ensure that the students will work on a research topic of their own interest, within the context of the posting.

Prior to the students' arrival at the local government area (LGA), meetings are held with LGA authorities, both governmental and traditional. The chairman of the local government area is the chief executive of the local government. He is first contacted and he will then direct the information to the necessary health authority and community leaders. In this way full community participation is anticipated. The LGAs provide accommodation and transport for the students for the period of eight weeks and also give them a catering allowance.

Activities of the Students

On arrival students are taken to their residence which is usually among the people or, on a few occasions, to a government guest house. Each LGA has three districts and each of the students is expected to have rotated through all three districts by the end of the eight weeks.

In the morning between the hours of 8-12 noon the students run clinics at the health centres, primary health care centres, general hospital or dispensary, depending on the available health care facility in a district. In the evening they interact with people in the community. This is when they collect data for their research project. They may also do so during clinic hours, depending on the nature of the research topic. This affords them the opportunity to get to know the people in terms of their health problems. In some instances it also helps them to understand the peoples' social problems, so that they can offer them useful advise. This is when most of the health education is carried out. For instance, the home setting provides the forum for advising mothers on a proper weaning diet for their babies, basic personal hygiene and sanitation practices.

The service activities of the students are supervised by a medical officer who is resident in the health facility. Where no medical officer is attached to the facility, a staff member from the Department of Community Medicine will supervise the students. He commutes daily from Maiduguri. The project supervisor and the head of Department also visit the areas three times a week. The staff member from the Department of Community Medicine or the local medical officer receives feedback from the students and passes them on to the Head of Department. In this way any problem encountered in the field is reported and will be investigated with a view to resolving it. The project supervisor takes care of those problems which cannot be handled at the local level.

At the end of the eight weeks a thesis is written, presented and defended, both by the group and by individual students. The presentation is made in the presence of junior medical students and members of staff. This is usually done to allow for criticism, so that the final report, which is graded, will be of a good standard. A copy of each project is made available to the chairman of the respective local government, and particular reference is made to the section on recommendations. When each group defends its project as a group, the project is examined using guidelines on scientific reporting. Each section of the project is scored separately. For example, the introduction carries 5 marks, literature review 5 marks, methodology 10 marks, observation on, and discussion of results 15 marks, and summary and conclusion 5 marks, making a total of 40 marks. Each individual defends the project on his/her own stating his/her major area of contribution. Each student is examined especially on this contribution and on overall competence in the project. The panel of examiners consists of the Head of Department, the project supervisor and the staff member or local medical officer. Each student is scored out of 20 marks, making 60 marks for the project.

Problems and Prospects

CBME is a relatively new concept in medical education, and, as it continues to evolve, many of the inherent problems are being resolved. Much controversy still surrounds the issue of whether it should be Faculty-based or department-based. This issue was debated at length at the 7th Biennial General Network Meeting and Scientific Conference at Ilorin,1991. It seems that the programme will enjoy more cooperation from other departments if it were Faculty-based. At the University of Maiduguri the programme is based in the Department of Community Medicine, and it has been very difficult to secure the cooperation needed from other departments to make the programme more successful. This is partly because of the non-receptive attitude accorded to the programme, and perhaps because of the paucity in the number of junior staff and consultants in most of the other departments.

A recent study on the attitude of final year students to the eight week rural posting* identified that the most problematic area for the students was the attitude of the community. Despite the efforts made prior to the students' arrival in the community and despite the continuity of the programme (the same LGA for 3 consecutive years), the attitude of people towards this programme continued to leave a lot to be desired. This is contrary to reports on similar programmes in other parts of Nigeria (Alausa et al., 1991). The slow pace of acceptance of this programme may be due to the purdah system, where married women are not allowed access to the opposite sex other than those in the household. If there is no female student in the group, access to female patients becomes impossible. Also, when there is a need to take blood, urine or other samples, the people usually become hostile. Many attempts have been made to overcome this problem. The need to properly introduce the students to the community has been well documented (Komolafe, 1991)**. During the introductory period the traditional community leader is usually persuaded to give a sample of blood and urine to convince the rest of his people of the harmlessness of the procedure. The use of incentives in terms of free medication has also proved very useful in gaining the confidence and cooperation of the people.

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* See the paper by Omotara, Padonu, Bassi and Amodu in this Volume of the Annals.

** See also the paper by Omonisi, Alausa, Bunin and Bichi in this Volume of the Annals.

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The Nigerian Community Health Officers (CHOS) and the Service Needs for Primary Health Care

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Abstract

The inadequacy of the previous western health professionals, in numbers but more especially in orientation and distribution, to meet the promotive, preventive and curative needs prompted governments to set up newer cadres of health workers for Primary Health Care (PHC), particularly in the developing countries.

A questionnaire on knowledge, attitude and intended or expected practice was administrated to trainee community health officers (CHO's) in three institutions in Nigeria, to cover possible variations in the CHO students, during the 1989/1990 academic year. 98% (84 of 86) of the CHO's responded to the questionnaire. Prior to their selection for training, 39% of the CHO's were working in rural areas. However, only 49% were expecting to return to rural areas after their training. Although 90% were ready to work in the rural areas at least for a while, there was little enthusiasm unless living and service conditions were improved. All trainee CHO's saw important obstacles to PHC in Nigeria which were considered to be primarily of a managerial nature. 76% expressed a desire for more surgical training beyond that provided in the present course.

The study shows that the same managerial problems that prevent doctors from serving in rural areas apply to these newer cadres as well. More attention should, therefore, be paid to these problems in the interest of optimal deployment of the CHO's.

Similar attention should be paid to these problems with a view to attracting doctors to some reasonable involvement in PHC at the grass roots.

Introduction

Primary Health Care (PHC) - the key to the attainment of Health for all by the Year 2000 - had been defined at the Alma Ata Conference as essential health care based on practical, scientifically sound and socially acceptable methods and technology, made universally accessible to individuals and families in the community through their full participation or

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involvement, at an affordable cost and in the spirit of self-reliance(World Health Organization, 1978). The training of new cadres of health and health-related workers for PHC has been undertaken by many developing countries in pursuit of their PHC programmes (Lambo, 1990; Oosterberg, 1988; Edghill, 1980). The most important justification for this emphasis has been the failure to orientate, reorientate, and/or produce an even and adequate distribution of health workers within the countries' health services, especially doctors. Without any observable effort to find out the reasons for such maldistribution, or, if already known (Morgan et al., 1973), without seriously attend to them, many governments have zealously pursued the training of newer cadres of health workers.

The present study was, therefore, carried out to establish the extent to which the professional background and anticipated practice of trainee Community Health Officers was likely to succeed where western trained health workers did not meet the needs of even distributional and appropriate orientations towards PHC. Three educational institutions in Nigeria which trained CHO's during the 1989/1990 academic year (one üniversiy teaching hospital-based programme, each at Maiduguri and Ibadan, and one at a school of hygiene/health technology in Ibadan) were used in the study to cover all the possible variations in the background of the trainees.

The CHO Training Programme

The CHO's are trained to work as alternatives auxiliaries to general medical practitioners or community physicians, especially in those areas where such doctors are not available. CHO's are thus expected to practise at comprehensive and primary health care centres in urban and especially in rural areas. Initially, they were to be recruited from among experienced nurses/midwives, and public health superintendents, as well as from rural health assistants and superintendents. The duration of their training was to be one calendar year, and the curriculum covered all aspects of community and basic medical care at the district level of health care in the country. Even though all the training centres were located in the big cities, the candidates were required to undertake a residential community and primary medical care practicum in a rural setting lasting up to three months. There were 12 such training centres in the country at the time of this study. Competence at the end of the course was assessed internally within each school and externally by national assessors.

There has been some uncertainty as to the career structure and prospect for these CHO's within the local, state and national (federal) health services. For most of the CHO's, their training and certification has only served as an extra qualification to help them with promotion within their original professional career as nurses/midwives or as environmental health officers.

The qualification also helped when applying for the post of PHC co-ordinator at local or state government level, where there were no medical officers of health (Community physicians) as coordinators. Recruitment for the course was by personal application. However, because of the cost of the course, agency or institution sponsored candidates were more likely to apply, be selected to take up their place and complete the course. Although there were a few health centres which were used almost as models for PHC and thus acquired more equipment for appropriate practice of PHC, generally no effective effort was made to equip PHC centres better. There were also no extra incentives to make the posts where the CHO's are expected to work more attractive.

Materials and Methods

In this questionnaire-based study, information was collected on the location and professional background of the candidates before they came for this training. Their knowledge, attitude, expected location of practice and other details relevant to PHC were also collected.

In order to encourage honesty in answering the questions the CHO candidates were assured of individual anonymity in the survey. They were asked to give their identity number only if they were willing to do so. Identity numbers would allow us to identify students, if need be, for any clarifications of their answers.

Results

Eighty-four of the eighty-six (98%) CHO's in training in the three institutions answered the questionnaire, 28, 33 and 23 from the three centres respectively. Table I shows the job designation of the respondents before their admission for training. The breakdown differs from one institution to the other, with more non-nurses at the Maiduguri centre. The job location of the candidates before, and the expected location after training, are shown in Tables II and III. Even though the selection of rural rather than urban location improved over all in the other two centres, it deteriorated at the UCH centre. Although the majority of the CHO trainees were selected from urban centres, a good proportion were ready to serve in a rural area (90%). However, most of them preferred to work for only a short period in such areas, unless the numerous obstacles for doing so were removed or meaningful financial/economic incentives were provided (Table IV).

The scope of the CHO training was felt to be inadequate by many of the candidates, especially in relation to clinical skills (Table V). Only 21% were satisfied with the training programme. Though the emphasis was on promotive and preventive health care, and many approved of that emphasis (Table VI), many of the 79% who did not feel convinced of the adequacy of the course coverage, listed additional items and indicated a desire for more surgical skills to be included in the training.

Table I. The Job designation of candidates before CHO training

Job Description	U.C.H. Ib.	S.O.H. Ib.	UMTH. M	Total (%)
Nurses	5	33	7	45 (53.6)
Public Health Nurses	15	-	-	15 (17.8)
Community Health	8	-	16	24 (28.6)
Total	28	33	23	84 (100)

Table II. Job location before training

Location	U.C.H. Ib.	S.O.H. Ib.	UMTH. M	Total (%)
Rural	12	19	12	33 (39)
Urban	16	14	21	51 (61)
Semi-Urban	-	-	-	-
Total	28	33	23	84 (100)

Table III. Intended or expected job location after training

Location	U.C.H. Ib.	S.O.H. Ib.	UMTH. M	Total (%)
Rural	7	21	13	41 (48.8)
Urban	4	5	7	16 (19.0)
Semi-Urban	17	7	3	27 (32.2)
Total	28	33	23	84 (100)

Table IV. Volunteered length of stay in rural areas after training

Period	U.C.H. Ib.	S.O.H. Ib.	UMTH. M	Total (%)
3 Years	25	30	21	76 (90.4)
Life long	3	3	2	8 (9.6)
Total	28	33	23	84 (100)

Table V. Attitude of students to the carreer structure for CHOs

Adequacy	U.C.H. Ib.	S.O.H. Ib.	UMTH. M	Total (%)
Yes	6	7	5	18 (21.4)
No	18	21	15	54 (64.3)
Not sure/ do not know	4	5	3	12 (14.3)
Total	28	33	23	84 (100)

Table VI. Perception of the trainees of the preventive and promotive emphasis in the training programme

Perception	U.C.H. Ib.	S.O.H. Ib.	UMTH. M	Total (%)
Very important	24	28	15	67 (79.8)
Minimally important	4	5	6	15 (17.8)
Not so important	-	-	2	2 (2.4)
Total	28	33	23	84 (100)

All the CHO trainees agreed on the existence of obstacles to the implementation of PHC and the achievement of health for all in Nigeria (Table VII). The problems listed by the trainees were categorised into three broad areas as shown in Table VII. Poor remuneration for community or primary health care workers, inadequate career structure for the CHO's and very poor living and service conditions for rurally located health workers featured prominently in the responses.

Table VII. Obstacles to the success of Primary Health Care in Nigeria

Obstacles	U.C.H. Ib.	S.O.H. Ib.	UMTH. M	Total (%)
Managerial	18	24	17	59 (70.2)
Lack of political will	5	6	1	12 (14.3)
Implementation	5	3	5	13 (15.5)
Total	28	33	23	84 (100)

Discussion

The major justification for the training of newer cadres of health workers for PHC is the inadequacy of existing health workers in numbers, distribution and especially in their orientation to meeting the needs of complete community health care for all the people. This applies especially to the new grades of primary health workers in the range of nurses to doctors, including the Nigerian CHO's. The yardsticks for assessing the success of the CHO programme should, therefore, be: 1) adequacy in numbers for the various communities in the country; 2) actual distribution to these communities; 3) adequacy of the training programme, or the candidates themselves in being properly orientated to community health care rather than an undue immersion in mere curative work.

Those aspects of these measures that can be evaluated by a study of the CHO trainees themselves were incorporated into this enquiry. At the Maiduguri centre candidates were selected from Northern Nigeria. Because of the greater lack of western trained health workers in this part of the country, they included a large number of the lower cadres of the newer and older PHC workers, the community health supervisors and rural health assistants/superintendents. The Ibadan Teaching Hospital candidates were selected from all over the country and reflected the spread of all types of the established western health workers in the range between nursing and medicine. The School of Hygiene, Ibadan CHO's were exclusively senior nurses from all over the South Western States of Nigeria undertaking a sandwich Public Health Nursing and CHO course.

The selection of the candidates (Table II) does not reflect the composition of the community of the country which is made up of some 75-80% of rural dwellers. The anticipated places of relocation after CHO training (Table III) did not reflect this distribution, except in the urban to semi-urban shift. This shift is in the right direction and may be a pointer to the fact that CHO's might perhaps be prepared to meet the needs of professional distribution for PHC, if at least some of the major obstacles were removed.

For this reason it is important to pay particular attention to the remediation of the obstacles to ensure adequate remuneration of PHC staff to reflect the claims being made for its importance. Enticing career structures for PHC staff, and the development of appropriate infrastructures and amenities - piped water, tarred roads, good schools and reliable electricity would represent essential requirements.

In relation to career structure, it would be interesting to consider the advantages of permitting CHO's who perform well to train further to become community medical officers, as is the case in the PHC programme in the Philippines (Oosterberg, 1988). That programme is run by the University of the Philippines, sponsored by the Government but independent of the medical school. This programme is perhaps the very thing the CHO's mean when they asked for more surgical training. However, it is more likely to be an indication of the inadequacy of the orientation of these candidates, even at this time, to the preventive and promotive aspects of PHC, rather than curation care only. The unwillingness of the CHO's to stay in the rural areas for long, unless a lot of the obstacles were corrected (Table IV) reflects the same reasons why doctors are reluctant to embrace community Medicine or indeed to practice PHC as currently provided (Edghill, 1980; Morgan et al., 1973). It is, therefore, possible that, if these obstacles were corrected, we could even expect to see doctors opting for Community Health and PHC practice at the district (Local Government), level, judged by the World Health Organization to be the operational level of PHC. We ought to be able to provide one such medical officer of health for each of Nigeria's Local Government Areas as the minimal norm. Without such meaningful involvement in PHC (i.e. including doctors, and adequate remuneration, it would appear that both community health, as well as the more precisely defined PHC dimension in our health services will continue to be taken as a second class type of health care. PHC would then fail to achieve the hopes that have been placed on it, or progress too slowly and at a very much less cost-effective rate.

A large, nationwide (total) study of trained CHOs is needed to assess the programme. We expect to undertake this study.

Acknowledgement

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Ife Experience in Community-Based Education for Health Professionals

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Abstract

The Faculty of Health Sciences of Obafemi Awolowo University started with an innovative, community-based and primary health care-focused curriculum in 1972. This paper describes the initial educational programmes of the Faculty and focuses on the planning, implementation and evaluation of the community-based aspect of the curriculum. This was subsequently neglected as new departments were created and new staff were recruited into leadership positions in the Faculty. In 1987, a revised community-based educational programme was developed. Adoption of primary health care (PHC) as a national health policy provided the main impetus for the change. Institutional mechanisms for planning, coordinating and evaluating the programme are described. The paper concludes with lessons learnt from the programmes.

Ife Philosophy, Objectives and Educational Programmes

The Faculty of Health Sciences of Obafemi Awolowo University, Ile-Ife, was established in 1970 by the former Western Government of Nigeria. Its foundation students were admitted into the Faculty in 1972.

Before the inception of the Faculty, there were variously articulated concerns for the relevance of medical and other health professional education to the health needs of the nation. Ife was the first university in the country to translate these concerns into reality, as shown by its educational objectives and service programmes (University of Ife, 1981-1983).

These included a clear commitment to: a) train a health team of graduate and non-graduate medical, dental, nursing and other personnel for the provision of comprehensive health care in any community in the State and the nation; b) train health personnel with considerable knowledge and skills to work effectively in both urban and rural areas of the nation; c) provide comprehensive health care to a defined geographical area of the State; and d) involve members of the community in the provision of health care to their communities.

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The Faculty provides undergraduate programmes in medicine (MB, CHB), Dentistry (B.Ch.D.), Nursing (B.N.Sc.), Medical rehabilitation (B.M.R.) and Environmental Health (B.Sc. EVH). There are also post-graduate programmes in various health and medical sciences and clinical professional disciplines of the Faculty.

The initial curriculum made a four year B.Sc. Health Sciences Degree a prerequisite for training in the clinical aspects of medicine and dentistry. The revised curriculum of 1972 removed the compulsory B.Sc. Degree, reduced the length of medical and dental education to six years and introduced intercalated B.Sc. Medical Science, "to a well-selected group of promising students who would become future teachers in the basic medical sciences in which there is an acute national shortage of Nigerian experts in all the existing medical schools" (University of Ife, 1989-1992). Table I shows current undergraduate degree courses offered by the
Faculty and the duration of the courses.

Table I. Duration of Ife educational programmes for health professionals

	Medicine (MB.Ch.B)	**Dentistry** (B.ChD)	**Nursing** (B.NSc)	**Medical Rehabilitation** (BMR)	**Environmental Health** (B.Sc.EVH)	**B.Sc. Medical Science (intercalated)**
Preliminary courses:	1 yr.	1 yr.	1 yr.	1 yr.	1 yr.	1 yr.
Preclinical courses:	2 yrs	2 yrs	1 yr.	1 yr.	1yr.	(after precl.)
Clinical courses:	3 yrs	3 yrs	3 yr.	2 yrs	4 yrs	

Between 1972-1982, medical and dental students were admitted to a four year B.Sc. Health Sciences course which preceded the 3 year clinical training.

Since the inception of the Faculty, teaching and learning activities involve the use of learning objectives, seminars, group discussions, self instructional techniques, and integrated lectures. Considerable emphasis was laid on training the different health professionals side-by-side. The students were exposed to similar teaching and learning activities during their preliminary and preclinical years. They took the same science courses - chemistry, biology, physics and mathematics - during their first year of University education. These courses were based in the Faculty of Science and were organised for science-based degree programmes. During the second year, nursing and medical rehabilitation students attended the same courses in anatomy, physiology, biochemistry, biostatistics, and behavourial sciences as medical and dental students, before concentrating on their various clinical courses during the third and fourth years.

Initial Community-Based Educational and Service Programmes

The Faculty adopted from the very start a defined geographical area, known as Ife-Ijesha zone, for its health service programmes. The purpose was to fulfill the objectives of producing health personnel that could function effectively in both urban and rural areas of the country.

The area of 3732 square kilometres had a population of about 1.2 million inhabitants in 1972, living mainly in about 700 villages and towns.

Four general hospitals and four PHC centres in the area were acquired by the Faculty for services, teaching and research. Health committees were formed for community participation in the PHC programmes. Members of the committees included traditional rulers, community leaders, senior health officers, and workers in other sectors such as education, information, and agriculture. Multidisciplinary health facilities location and needs assessment surveys were conducted to obtain baseline information for the planning of a model basic health service for the catchment area.

The original community-oriented part of the medical curriculum was taught mainly during the last three years of clinical education. The community-oriented educational programme was based in the Division of Community Care, the forerunner of the Department of Community Health, with centralised planning and coordination which involved all members of the Faculty. The objectives of the programme included the ability of the student to: a) "assess the health status of a community, define its major health problems, allocate priorities and formulate plans for dealing with them; b) work in or lead a health team; c) undertake community health education; and d) tailor his/her activities in respect of the health needs of the community, so that they can reflect the social, economic, psychological and ecological factors of the area" (University of Ife, 1976-1978).

The students spent about 10% of their time in Years 5 and 6 and 25% of their time in Year 7 on the community-oriented programme. They were posted to PHC facilities in the rural communities to conduct community-based investigations under supervision and to render services in the communities and at the PHC centres.

The Faculty provided transport and accommodation for the students and their supervisors. A certain amount of money was allocated by the Faculty for community involvement activities and a part of this was used for running the programme. Other support for the programme came from the community through the community health committees.

A major drawback of the programme was that the community-based components of the educational activities of the students were not adequately evaluated for their effectiveness and efficiency. However, experience showed that the programme was enthusiastically accepted by students, staff and the community. By 1982, when the programme was no longer implemented regularly, one community sent a delegation to the Department of Community Health to find out why the 'student doctors' were no longer seen in their community.

Problems Encountered with the Original Community-Oriented Curriculum

By the end of the 1970s the community part of the original curriculum began to suffer from benign neglect. New departments were created from the Division of Community Care, and new staff, who were not committed or orientated to the original philosophy and objectives of the Faculty, were recruited into leadership positions. The centralised approach to planning and allocation of resources to the community-based educational and service programme gave way to decentralised, departmental programmes. Each department began to concentrate its resources into the teaching of its core areas of specialisation. Resources for supporting and maintaining the community-oriented programme, therefore, dwindled. Those of the Faculty members who were not committed to the original philosophy and objectives of the Faculty pressed for a change of the programmes in favour of the traditional approach. Although the revised curriculum for medical education in 1982 stressed "community-oriented medical practice" and, "early introduction to community medicine", the students' exposure to community health programmes never went beyond the confines of a few health centres, mainly in urban and semi-urban areas.

Revise Community-Based Educational Programme

Since the middle of the seventies, PHC became a major focus for health service programmes in Nigeria (Federal Ministry of Health, 1976) and was perceived as an approach for addressing the health needs of the majority of the population of the country, especially those living in rural and semi-urban areas (Federal Ministry of Health, 1978). The National Health Policy, formulated in the eighties, was based essentially on the PHC philosophy, objectives, strategies and programmes (Jinadu, in press). It, therefore, became very obvious that, in order to make medical education relevant to the needs of the country, a substantial part of the curriculum should be devoted to PHC educational programmes. PHC cannot be taught in a vacuum; communities and their resources have been accepted as laboratories for medical schools in developing countries.

Therefore, the Faculty of Health Sciences decided in 1987 to re-examine the PHC aspects of its medical curriculum and to formulate a programme for its implementation. A committee was formed, and its members were drawn mainly from the departments of community health, paediatrics/child health, environmental health and epidemiology, and obstetrics and gynaecology. This committee developed a revised community-based education, service and research programme called Rural Comprehensive Health Programme (RUCO). The programme is based in the Dean's office, and its general objectives are to: a) provide organised rural community exposure to trainees in health sciences; b) provide facilities for individual and interdiciplinary research relevant to the needs of the community; and c) make a measurable impact, on an on-going basis, on the health of the community.

The students' educational objectives include: a) community diagnosis through collection, analysis and interpretation of community-based data; b) self-directed learning; and c) initiating and evaluating lines of action for solving identified community health problems.

The RUCO programme is located in the Imesi-Ile and Isoya areas of Obokun and Ife central local government of Osun State. The two areas are within the Ife-Ijesha community, the previous catchment area of the Faculty. Imesi-Ile area consists of a group of 12 villages and towns with a total population of about 200,000 inhabitants. A rural health centre, which was acquired by the Faculty at its inception, has been upgraded to a modern comprehensive health centre for training, research and services in a rural setting. The Isoya area consists of 11 villages with a total population of about 6,100 inhabitants, located 15-45 kilometres from the University.

Medical students are posted three times in this programme. The first posting is for four weeks in Year 2, the second is for four weeks in Year 4, and the third is for eight week in the final year. For the first posting the students are divided into small groups of 5-10, depending on the size of the class. The groups carry out community-based activities that are related to surveys of community needs. During the subsequent postings, the students carry out specific community-based problem solving research activities and participate in the delivery of PHC in the rural communities.

Assessment of the students' learning activities are based on:
- Seminar presentations of project reports;
- Progressive written examinations and end of the course examination;
- Attitudinal assessment of the students by their supervisors;
- An assessment of the Community Health Project by independent assessors.

These items are given different weighting before the scores are added together.
A coordinator is responsible for planning and programming the educational activities, as well as for the maintenance of the programme. Academic and technical staff of the Faculty, especially those from the Department of Community Health, are responsible for supervising the students in the community. Recently, a PHC committee was formed and headed by the Dean. Members of the committee are drawn from various departments of the Faculty. The committee that ensures the sustainability of the programme is responsible for evaluation. Although no formal evaluation of the programme has yet been conducted, experience so

far has indicated that the programme is potentially able to achieve its objectives. The students and the community have reacted favourably to the programme. Members of the rural communities have always welcomed the students and staff, especially where the students and staff have not only collected survey data, but also provided some services.

Implementation of the RUCO programme is not without its problems. The main problem is lack of finance. The programme has no vehicle of its own for taking students and staff to and from the rural areas. It has to compete for transport with other clinical programmes in the Faculty; quite frequently the students are unable to conduct the community-based activities in the designated rural areas. Other essential equipment and supplies for the smooth running of the programme are often not available. This lack of equipment leads to frustration among the staff and students. The problem could be resolved, if it were specially funded by the government or by external sources.

Conclusions

Medical schools in developing countries that aspire to make their educational programmes relevant to the essential health needs of their countries can no longer afford the luxury of ignoring PHC education, services and research. An effective way of achieving this is to strengthen the community-based curriculum. However, adequate implementation of the community-based educational programme requires appropriate funding. Adequate institutionalisation of the programme and education of new staff through seminars and workshops are also essential.

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Community-Based Experience and Service (COBES) Programme

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Abstract

This paper on the Ilorin community-based programme includes a general description of the education and service elements in the various postings of medical students during their undergraduate course. Emphasis is given to the careful preparation of government and local authorities to ensure smooth acceptance of the students in the community. An Appendix sets out the general and specific objectives of these educational experiences.

Introduction

The University of Ilorin Medical School is one of the newest medical schools in Nigeria. It was started in 1976 with 46 students drawn from various parts of Nigeria. It operates a six-year medical programme for students following their high school education.

At the inception of the Medical School, the funding fathers wanted to do something different from other conventional medical schools. They planned a curriculum that was integrated, student-centred and problem-solving in concept. The disciplines of anatomy, physiology and biochemistry were taught together by three or four lecturers, each having an input into the body-system being discussed by the class. The programme was a revolution in medical education in Nigeria.

The part of the curriculum that has received the best comments and popular acclaim by older medical schools in Nigeria is the Community-Based Experience and Service (COBES) Programme of the Faculty. We have recently been designated a Collaborating Centre for Health Manpower and Training of the World Health Organization.

In this programme, the students are sent out to the community at the beginning of their studies to see what health knowledge they can gain and develop during this posting. The concept of early exposure to the community was based on the problems that faced Nigeria. The doctors produced by the medical schools had not been willing to work in rural communities. The Faculty decided that if students were orientated towards Rural and Community Medicine at the very beginning of their six-year programme, they would gain a feeling for the services needed by rural communities and might cultivate a liking for service in rural areas.

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The aims of the COBES programme are:

1. To train medical students in community public health in different rural settings.
2. To let the student see and appreciate local health problems early in their medical training.
3. To make the Medical School acceptable to the Community.
4. To put medical theory into practice.
5. To implement an interdisciplinary approach to medical education that is not limited to any one department.
6. To render service to the community (see COBES objectives in the Appendix).

This programme needs a great deal of planning and funding to make it effective. The Faculty appoints a COBES coordinator to oversee of the successful implementation of the posting. Two Faculty-based committees assist the coordinator in his duties, the Academic Planning Committee (APC), responsible for the academic content, and the Logistic Planning Committee (LPC) that arranges transport, catering, housing, medical care and other logistics.

Each class of students is divided into four or more groups of 20-30 students. In order to make the students acceptable in the communities, female students are evenly distributed among the groups. They will be able to contact women who are in "Purdah" and who cannot be visited by male students. Each group has four or five staff members as advisers. As far as possible, the students are encouraged to live in the community during their posting. In their second year, the students spend four weeks in the community, a further four weeks in their third year, and three weeks in the fifth year of their undergraduate education.

Reaching the Community

At the commencement of every posting, each group of students and staff meets together with the heads and the elders of the villages. The purpose of the posting is explained to the village head and his team, and their cooperation is sought. The village head will then announce the presence of the student through the town crier and in churches and mosques on religious days, so that the community can be aware of the presence of the students. Each house leader is then advised to so inform every member of his household, so that the students will have a problem-free posting.

COBES Postings

The students start each posting with an exercise in demography. They have to draw a map of the area with the number of individual houses and identify the available health facilities. From then on, they can carry out different surveillance studies on the chosen topic of the posting. Examples of past topics are: parasitic diseases, mental illness, alcoholism, E.P.I., drug abuse, diarrhoea diseases, skin infections, blood pressure, ill health in school-children.

The COBES sites are carefully chosen, so that the students can move to different areas to do their demographic work, in order to avoid repeating the same exercise and to prevent students from copying old reports. This has made annual interviews bearable for the communities. The second posting usually uses the WHO theme of the year. This has involved house-to-house interviews with the inhabitants and physical examination of members of different households. In some cases where people work away from their homes, the students have to repeat their visit in the evening.

Each group has a base where the staff members supervise the use of drugs for minor ailments. Students refer to members of the staff those patients who needed urgent treatment. Serious cases are referred to the teaching hospital.

At the inception of the programme, the Faculty did not plan to treat patients in the community. As time progressed, health care became necessary, in order to ensure continuing support and cooperation from the residents during the two to three 4-week postings each year. A large chunk of the COBES budget has had to be used for the procurement of drugs and dressing. The addition of service to our programme has greatly boosted cooperation and support for the COBES programme in the area where it operates. The students have also been able to assist the communities with watersupply, latrines, and, in one instance, electricity. Such help has been possible through the contact which the students were able to make with authorities such as the State Government, Local Government and the Directorate of Roads and Rural Infrastructure (DFFRI), as well as with the Rotary and Lion Clubs.

Assessment of Students and Reports

At the end of each COBES posting, a day is set aside where members of each group present their findings and results of the COBES posting to the other members of the class and staff members of the Faculty. The presentation is assessed by Faculty staff and outsiders. The students also undertake a three hour written examination, and the staff supervisor of the groups assesses each student's performance on site. A comprehensive report is prepared subsequently by the COBES coordinator for the Faculty, the University authorities and interested parties like the Ministry of Health and the Local Government to justify continued funding for the programme.

Discussion

The University of Ilorin Medical School has taken great care to sell its programme and its students to the community, a marketing strategy. The programme has also sold medical education to the students. This has been due to the Faculty's policy of orientating students towards community based problems and finding solutions for them. One of the major problems of Nigeria's Health Delivery Services has been the inability of Government, State and Federal, to induce doctors to work in rural areas. This problem was paramount in the mind of the designers of the COBES programme. If students can be encouraged to undertake community work as they are taught in COBES, they may not object to working in rural areas later on in life.

The programme has involved careful budgeting. This is necessary in order to cut costs to the barest minimum and yet achieve the best possible results. At an annual financing session, chaired by the coordinator, each group leader requests a budget by defending his needs for beds and bedding, catering, transport, housekeeping, and drugs and dressings. This should help medical students, early in their training, to appreciate the need for prudent spending.

Local politics has also been involved in the COBES postings. The contact between the students, village and local heads and religious and local government leaders is very encouraging and could be strengthened. Local leaders need to be deeply involved and informed if appropriate arrangements for health care are to be effective. As a result of the Faculty's efforts some communities have formed local committees that have taken a keen interest in the COBES activities of the students and they have greatly assisted the students in organising health talks and demonstrations for the communities.

Information on the programme has been widely disseminated by the student presentations and the coordinator's COBES reports which are made available to the Ministries of Health, Local Governments, University, and staff and students of the Faculty. The programme has used the available resources of the Faculty to the immense benefit of everyone concerned.

Conclusions

The COBES programme has been widely publicized in the press, radio and T.V. of the State. The Federal Government, due to the constant requests for funds through the Ministry of Health, the National Universities Commission and the University, has built two Comprehensive Health Centres for the Medical School in the State, so that the programme can expand and flourish. Recently the Faculty has constructed two student hostels, so that the students can live on site.

Older medical schools have praised the programme, and the graduates of the first eight classes are registered medical practitioners in the country's Health Delivery Services.

APPENDIX

Terminal Objectives

At the end of the course, over a period of six years, the new graduate should:

1. Be sensitive to Community Health needs.
2. Be able to establish a relationship with his patient and his background.
3. Be seen to contribute to and assist Community Health effort.
4. Be able to work in any community on his own with adequate knowledge of the influence of culture and socio-economic situations on his patients.
5. Have team spirit towards solutions of health problems of the community.
6. Have developed habits of individual study.
7. Be able to organise a health scheme for a school or a community.

Limited Objectives

A. *Surveys*

A.1 Plan and effect a simple estimate of the population in a given area.

A.2 Use the data obtained (in A.1) and collect facts by means of surveys on the health needs of the area.

A.3 Analyse the data (in A.2) to design a plan of priorities for action to improve the health of the community.

A.4 Carry out community-wide measures or campaigns (designed in A.3) with the help of relevant members of the team.

A.5 Monitor the effects of health measures or campaigns and modify these as necessary.

A.6 Communicate findings of his work and relate them to the development of medical care and scientific advances.

B. *Clinics*

B.1 Supervise the workers of a health team and lead them.

B.2 Run clinics and perform home visits for patients with social problems and report on two of them.

B.3 Maintain necessary supplies for a clinic and work with the relevant health authority to achieve this.

C. *Environment and Culture*

C.1 Gather information about prevailing attitudes to health and disease in any community and use it when planning the health care of individuals or of the community.

C.2 Identify climate and seasonal factors which affect the patterns of disease, nutrition, work and movement of people in any area and use such data in health planning.

C.3 Identify aspects of culture that are injurious to health and learn to counsel on them.

D. *Work*

D.1 Given a workman with disease, identify the effect of the course and outcome of his disease on his work, and the effects of his work on his disease. Act to enable him to work effectively.

D.2 Rehabilitation of a disabled workman in the community.

D.3 Be able to advise on health measures in a factory, in a workshop.

To enable him to achieve these objectives, the student should be equipped:
a) to find out as much as possible about the community in which he is working;
b) to analyse the information he collects; and thus c)to apply it wherever it affects decisions about health and disease.

Attitudes, Customs, Habits

Thus he should be able to:

1. Communicate with members of the community and seek to be a member of it rather than to continue as a stranger within it.
2. Gain the confidence of its leaders and of its people through disciplined service.
3. Record the prevalent believes about the cause, practices related to the prevention and cure, and fears about the effects of common diseases.
4. Identify (from 3. above) those believes, practices, fears and attitudes which are detrimental to health; plan means to correct them, and put these plans into practice through members of the community and of the health team.
5. Record the common customs of the community related to pregnancy, childbirth and the puerperium and identify those which may adversely affect mother or baby, and by planned education of mothers through the health team seek means to change such customs.
6. Identify the hierarchical structure of the community, its leaders, and those to whom preference, privileges or authority is given, and use the knowledge of this structure in all plans related to health and its promotion.
7. Identify and, wherever possible, record and measure those influences/factors within the community which are changing its traditional practices and values, and take account of such influences/factors in all plans for its health services.
8. Given the fact of change, identify the prevalence of those habits relating to alcohol, tobacco, drugs, self-medication, methods of transport and the abuse of sex which may affect health, and take all means possible to inform the community about their known dangers.

Nutrition

1. Identify the staple foods of the community, record methods of production and storage and supply, together with the cost and availability of supplementary foods, at all seasons of the year.
2. From 1., identify the seasons of the year when supplies are short and the specific nutritional deficiencies which are liable to arise.
3. From 1. and 2., identify those people or groups of people within the community who are particularly at risk of nutritional deficiency and devise a plan to ensure that they are

protected.

4. Record the practices used in weaning and feeding infants, and in feeding other members of the family, and identify the effects of these practices on the nutritional value of the food and on the contamination of food with micro-organisms.
5. Identify practices which are detrimental to health and plan how these can be changed through education and other necessary means, and take initial steps to implement these plans.
6. Record the changes in eating habits in the community, identify the likely effects these will have on health, and cooperate with community leaders through the health team in education about the effects of these changes.

Medical students trying a bore-hole pump constructed with their assistance for a COBES site village.

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Preparation for the First Community-Based Programme of Bayero University

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Abstract

The foundation members of the undergraduate programme for the 5 year medical training programme began during the 1986/87 academic session in Bayero University Kano, Nigeria. The medical school, from its inception, adopted an innovative medical education philosophy with a programme of relevance to community health needs - called Community-Based Medical Education and Services Programme (CBME & SP), a programme which emphasized early introduction of students to the community for learning and service. The programme, therefore, included field postings.

Preparations for the implementation of the programme took approximately 10 weeks, from January to March, 1987. Formation of a planning committee by the Faculty was seen as a focus for staff involvement. The main responsibility of the committee was to develop strategies for the CBME & SP. The staff involved in the programme were introduced to the ideology during seminars and a workshop.

Permission was obtained from relevant government agencies to allow us to approach communities and their health services for the purpose of using them for our field operations.

Three members of the Planning Committee visited 21 communities and sought their cooperation. The visits enabled the team to take oral evidence of what the people regarded as their health problems. Using a 76 point rating scale, two communities were selected. The objectives and curriculum contents were then drawn up.

Several follow-up visits led to free accommodation for the students and staff during the field posting. The District Heads requested the village heads (Dagachi) to ensure full cooperation by the ward heads.

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The students had a number of preparatory lectures in the orthodox basic subjects and they were taught how to prepare survey instruments and how to conduct interviews.
Finally, the Faculty's Minimum Learning Objectives were given to the students, and a joint meeting of the staff and students discussed the roles of the Faculty staff. Lack of sufficient reading material, lack of staff experienced in community-based work, and lack of transport proved to be serious constraints.

Introduction

The acknowledgement of the values of community-based/oriented programmes as cardinal to the training of health professionals motivated the Dean of Bayero Medical School to entrench in the medical curriculum a programme entitled Community-Based Medical Education and Services Programme (CBME & SP). The Bayero Faculty of Medicine accepted the initial intake of 22 students (16 males and 6 females) for the 1986/87 academic session, some ten years after the establishment of the Bayero University.

Aims and Objectives of the CBME & SProgramme

The Community-Based Medical Education Programme is essentially a stage-by-stage field training programme. The purpose of initiating this field training programme includes that the students should learn:

- how to approach a community in an acceptable manner, either as groups or individuals;
- how to communicate effectively with the community;
- how to work with the people of a defined community;
- how to plan and execute with the community developmental health or health-related programmes;
- and understand the simple administrative procedures, either routine or specific, within a primary health care setting;
- how to identify, analyse and write reports on the problems of a community;
- how to find solutions and prioritise them in solving problems of the community;
- how to work with a health team in a community;
- how to initiate, maintain and constantly evaluate established health programmes in a community.

These objectives are intended to help the students to acquire the necessary knowledge, skills and attitudes for community health practice.

Procedures Adopted in Preparation for the First Field Posting Experience

A. Establishment of the Faculty Committee

The Faculty Committee on CBME & SP was established in order to create a viable integrated programme which would meet the students' learning needs in the community. The Committee was charged with responsibility for:

- developing suitable minimum learningobjectives;

- developing the strategy to meet the learning objectives, including community and sectoral involvement;
- working out the requirements for carrying out the programme:
- developing guidelines for the selection of suitable sites;
- setting the date of commencement and supervision period of the field training programme; and
- developing evaluation procedures for the programme.

The membership of the Committee included representatives from all the departments in the Faculty of Medicine; the Department of Sociology and Demography in the Faculty of Social and Management Sciences; participating communities; the students; Local Government; the State Ministry of Health; the Ministry of Education; and a general medical practitioner/community physician.

The Committee was given the power to co-opt anyone who could contribute meaningfully to the success of the programme.

B. Preparation of Staff

The conduct of the field training programme rests on the staff of the Faculty, as well as the health institutions which serve as the field or operational base for the students. Preparation of staff is here reported under three headings: seminar and workshops for Faculty staff, and preparation of field staff.

Seminar for Faculty staff. A one day introductory seminar was organised for both academic and non-academic staff of the Medical School and the Department of Sociology and Demography. The objectives of the seminar included:

- introducing the staff to the philosophy of CBME & SP and the nature of CBME & SP;
- the method of implementation;
- the roles of academic and technical staff in the implementation of the programme.

Several papers dealing with different aspects of the community-oriented approach to medical education were presented. The presentors included a physician who was a graduate of the Community Medical Education Services (COBES) of the University of Ilorin.

Follow-up workshops. Subsequently, two workshops were conducted to discuss the involvement of the staff at every phase of the programme:

1. Classroom involvement including lectures in community-related and social science subjects, and supervised discussion groups.
2. Organisation of introductory orientation and educational visits.
3. Execution of the programme in the field:
    - discuss the programme with staff to lead each team and live with the students throughout each field posting;
    - lead the students to their community location, including visits to social service institutions;
    - procure suitable accommodation for students and staff for each posting;

- guide students (if necessary) in planning their daily activities;
- see to the welfare of the students through counselling when necessary;
- supervise the programme;
- liaise with the Faculty/Dean's office as occasion may demand.

Preparation of field staff. Faculty staff and student representatives (2 males and 2 females) visited the health and educational institutions to be used as the operational base by the students:

- to explain the Faculty's proposal on the CBME & SP field posting, and the benefits which could accrue from the interaction between the field institutions and the Faculty;
- to discuss the roles of the local health staff.

C. Preparation of the Medical Students

The students must be the focus, if the community-based field training programme is to be successful. The preparation of the students must ensure:

- a proper understanding of how to enter communities successfully;
- familiarity with living arrangements in the community during the field posting;
- understanding of the environment for working and learning in the communities;
- appreciation of students working together as a team.

To achieve these objectives, it was necessary to expose the students to a number of relevant preparatory and introductory topics on sociology, demography, health education, ecology and tropical environmental studies, human nutrition, epidemiology, statistics, microbiology and parasitology. These introductory topics were taught along side the orthodox basic medical sciences subjects (WHO, 1970).

Orientation visits were made to places of interest in relation to community development and health. Principles of questionnaire design were taught, and the students were encouraged to put this into practice. The students were then given the minimum learning objectives as described by Alausa (1988).

The students were also given intensive preparation in subjects, such as community dynamics, in order to develop appropriate attitudes and skills for successful entry into the communities with a good working relationship. In order to attain these objectives, the following steps were taken during the ten week preparation:

1. Lectures in basic medical science subjects, i.e. anatomy, physiology and biochemistry.
2. Introductory/preparatory lectures in sociology (20 hrs), demography (18 hrs), health education (24 hrs), tropical environmental health (30 hrs), human nutrition (24 hrs), epidemiology and statistics (20 hrs), microbiology (8 hrs), and parasitology (10 hrs).
3. Group discussion was also used extensively to explore the students' perception of society and the programme.
4. Practical demonstrations featured prominently in the art and methods of communication, and methods how to conduct inverviews in a community, how to prepare a questionnaire as a major survey instrument, and how to complete the questionnaire.
5. Orientation visits were paid to:

- some health delivery institutions within Kano metropolis, i.e. health centres, health clinics, dispensaries;
- the Local Government Health Office;
- the Water Supply Organisation known as WRECA;
- refuse disposal sites in an urban and a rural community;
- the market place.

6. Student representatives accompanied the Faculty staff when preparatory visits were made to community leaders, i.e. the Local Government Chairman and Hakimi - the village and ward heads.

D. Joint Meeting of Staff and Students

A joint meeting of students and staff took place approximately three weeks before the commencement of the field posting. The meeting provided an opportunity for questions and answers, particularly on the logistics. Potential problems were exhaustively discussed. The items required for the posting were identified by staff and students. They included:

- academic/technical and administrative staff,
- accommodation for resident staff and students,
- beds, matresses and bedding,
- gas lamps or lanterns/electric bulbs,
- gas cylinders or kerosine stoves,
- folding writing tables and chairs,
- buckets and cans for drinking water,
- cutlery and crockery,
- suitable functioning vehicle with oil and petrol,
- stationery,
- calculators,
- audio-visual equipment and public address system,
- money for team leaders for incidental expenses.

Request was made to the Faculty for the purchase of the above materials, except for a vehicle because of its prohibitive cost.

E. Students Organisation and Preparation

As the first field posting was to be based at Bichi and Dawakin-Tofa communities, the students were divided into two groups, each with 8 male and 3 female students. The students were encouraged to organise themselves into functional groups to manage their field activities, and the following groups emerged:

- A map group which was charged with the responsibility of conducting a brief survey of the community, and to draw a map showing the more important places;
- A programme development group was to design an appropriate questionnaire for the survey, and to plan the day-to-day activities. Staff assisted when necessary.
- A food and welfare group was responsible for carrying out the domestic chores, as well as preparing the daily food. Rotation of groups and activities was agreed, in order to enhance the sharing of experiences.
- A report writing group ensured that each team member, as well as the other students

would play a specific part in the collation and analysis of the data which was fed into the group report at the end of the posting.

Pre-course reading and pre-field posting questionnaire. The students were given some references from past COBES reports from Ilorin, as well as books and journal articles relating to community-based programmes. A questionnaire was completed by the students on the day before the programme commenced. The questionnaire asked for the following:

- sex and ethnic background of the student;
- what the student understood community dynamics to mean;
- what the student understood CBME & SP to mean;
- what the students expected from the community to which they were about to go;
- what importance the students attached to their preparation for the CBME & SP field posting;
- whether the preparation had been adequate;
- what the students expected to gain from the field posting;
- if the students anticipated any problems in the field, to list those problems, and to propose solutions;
- what the students would like to do in addition to the Faculty guidelines;
- what each student would like to see included in the preparation, in order to improve future postings.

F. Preparation of the Communities

Approval from Kano State Authorities. Any programme had to be approved by the State and Local Governments, in order for it to gain community acceptance. The appropriate authorities were approached by letter and personal contact; including the Military Governor's Office, the State Ministry of Health, the Ministry of Education, the Ministry of Social Welfare, and the Ministry of Local Government. Similar approval was sought from relevant parastistals or Government Agencies.

Selection of the communities. The Dean of the Faculty gave one of the authors (M.K.O.) the responsibility of designing the selection of practice sites for the students. A 76 point rating scale was designed (Fig. 1).

Three Committee members visited 21 communities. Two communities with maximum scores were selected for the first posting: Bichi, the headquarters of Bichi Local Government, and Dawaki, the headquarters of Dawakin-Tofa Local Government. Two other communities with similar ratings were selected for the second field posting.

Information gathering and dissemination. After obtaining the necessary approval from the relevant government agencies, a three-men committee visited:

- 21 communities to see the community leaders to explain the establishment of Bayero Medical School and the CBME & SP philosophy, and to seek the cooperation and participation of the communities;
- all the health institutions involved in Primary Health Care services to study their facilities.

The opinion of community leaders and health staff were sought in relation to the health problems of their communities and the anticipated benefits that might accrue through this model of training of the undergraduates.

Community participation. Follow-up visits were paid to the two communities that had been selected by the Faculty. Each community generously provided accommodation at their own expenses for staff and students. The cost of water and electricity was also met by the people.

G. Final Phase of Preparation

The minimum learning objectives were given to the students, and one staff member was asigned as leader to each team, while the students were in the field. Staff with specific skills were appointed to visit each team twice weekly in the first two weeks of the programme and, thereafter, once a week until the end of the posting. The visits were intended to help staff and students to solve problems which the resident staff might not be able to resolve. These visits would also have a morale boosting effect.

Start of the Field Programme. The familiarisation visit took each group to the head of their local government district and the counsellor for health (Fig. 2). The District head ensured that places of interest to the programme could be visited without hinderance. More importantly, a ward head was assigned to the students to take them round and introduce them to the communities. Visits were also paid to places such as the primary and secondary schools, the native court, the market, the bank and police station, and recreational facilities in each of the villages. With the map and the questionnaire that the students had prepared, they began to probe into the demographic characteristics of the communities and their health problems.

Discussion

The Bayero Medical School, a newly established Faculty, had no tradition to follow. Its newness was an advantage for commencing a programme without traditional opposition from staff; hence the successful entrenchment of the CBME & SP into the curriculum. The idea of a community-based programme was new to almost all the staff. The exceptions were the dean, one of the guest lecturers who was a community physician, and the author (M.K.O.), who was given the challenge of organising the programme. The very newness of the concept became a motivating factor for both staff and students. The students accepted the programme without reservation. Kano State was at that time badly in need of trained health professionals, particularly physicians. The idea of cooperation and collaboration between selected communities and the medical school was most welcome, as it gave the people hope of solving their need of health professionals.

The thouroughness in preparing the programme in just 10 weeks, the use of defining objectives and the methods adopted for preparing the students about the dynamics of communities, and the way in which the ideology was presented to the staff during seminar and workshops were essential elements in the successful introduction of the programme. Furthermore, careful observation of the offical government protocols and the numerous personal visits to agencies and community leaders contributed immensely to the smooth acceptance of the students into the communities. The cooperation of the University authorities was commendable.

The major constraints during the period of preparation were fourfold:

- Acute shortage of academic staff. The effect of staff shortage on supervision of students is well known.
- Lack of staff with previous knowledge and experience in community-based programmes made considerable demands on the main organiser of the programme.
- Lack of vehicles was a major constraint.
- Gross inadequacy of books and journals had to be faced.

I.	Points		Well defined community(ies) with similar socio-cultural background:
		1 (a)	Not well defined community(ies)
	(6)	2 (b)	Well defined but non-homogenous - language/religion
		3 (c)	Well defined and homogenous
II.			Availability of health facilities - community/government:
		0 (a)	None available
		1 (b)	Availability of Health Faculty
	(10)	2 (c)	Available and functioning
		3 (d)	Private or community-owned
		4 (e)	Operating with qualified staff
III.			Rural Health centre infrastructure:
		0 (a)	None
		1 (b)	Available
	(6)	2 (c)	Functioning
		3 (d)	Located less than 1 Kilometer from the community
IV.			Accessibility - good road / nearness to the Medical School:
		1 (a)	Foot path
	(6)	2 (b)	Unsealed but negotiable
		3 (c)	Sealed road
V.			Receptiveness of the community(ies):
		1 (a)	Poor hospitability
	(6)	2 (b)	Indifferent
		3 (c)	Hospitable/warm
VI.			Population / manageable size of household:
		1 (a)	Fewer than 2,500 (200 houses), not above 15,000 (1500 houses)
	(6)	2 (b)	Between 2,600-5,000 (260-500 houses)
		3 (c)	5,000-14,999 (1400-1500 houses)

VII.			Availability of suitable accommodation for students/staff:
		0 (a)	None available
		1 (b)	Available for 15-20 students
	(10)	2 (c)	Accommodation capable of taking tudents and staff.
		3 (d)	Available with adequate windows and toilet facilities
		4 (e)	Available with extra space, e.g. for group meeting and recreation
VIII.			Cost of accommodation:
		1 (a)	Available for rent to Faculty
		2 (b)	Available at partial rent to Faculty
	(10)	3 (c)	Available free to Faculty
		4 (d)	Payment of electric bills by the community
IX.			Well / piped water supplies:
		0 (a)	None available
		1 (b)	Available sporadically
	(10)	2 (c)	Continuously available but not in sufficient quantity
		3 (d)	Available always in adequate quantity and quality
		4 (e)	Available with good alternative supply in clean environment
X.			Availability of electricity:
		0 (a)	None available
	(6)	1 (b)	REB (Rural Electrification Board)
		2 (c)	National Grid
		3 (d)	National Grid and standby generator

Maximum score points: 76

Figure 1. Scoring scheme for selecting communities, devised by M.K. Omonisi

Conclusion

The challenge of preparing staff, students and the communities for the programme was met successfully because of the full cooperations by all concerned, and the commencement of the programme was thus very encouraging. The solution of the problems that were identified would need a number of decisive interventions. These would include:

- Recruitment of interested and committed physicians and other health professionals with adequate experience in running community-oriented programmes;
- Employment of Kano indigenes to participate in the programme;
- Incentives for staff who participate in the programme;

- Purchase of new vehicles or repair of existing stock; one bus would be ideal for each site, each equipped with a public address system;
- Purchase of appropriate textbooks and journals would significantly boost the preparation and implementation of the programme.

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World Health Organization. (1970). *Social sciences in medical education.* WHO Chronicle, Vol. 24, No. 10, 478-481. Geneva, Switzerland: World Health Organization.

Activities	Months	March									April	
	Weeks	I			II	III		IV		V	VI	
	Days	1	2-6	7	8-14	15-18	19-21	22/3	24-27	28-34	35/6	37-41
Introduction to community and leaders		■										
Operational activities/ planning			■									
Pretesting of instruments				■								
Data collection; Primary project					■	■						
Data analysis							■					
Instrument design								■				
Optional project, data collection and analysis									■			
Report writing										■		
Presentation of report to Faculty and written exam											■	

Figure 2. Schedule of the field training programme

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Training Students in the Principles of Community-Oriented Primary Care in the Rural Southern United States

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Abstract

We report on the development of a four-week rotation for fourth year undergraduate medical students and third year postgraduate family practice residents based on the methodology we have used in an ongoing Community Oriented Primary Care (COPC) Project located in Madison County, North Carolina. The COPC project has: defined and characterised the county; identified county health issues; modified or developed new health care programmes to address priority health issues; and is monitoring the effectiveness of these programmes. The student experience is planned to run in parallel with the above process through the use of structured self-directed learning tasks, interviews with community people, and denominator-data-informed clinical patient experiences alongside physicians and non-physicians. Students learn what data to gather about a community, where to access this information, how to define perceived health problems with people in the community, how to work with community groups, and how to treat patients within this community perspective. Only through such learning experiences will students develop the attitudes and skills they need to practise medicine with a community perspective.

Introduction

To produce primary care physicians who are better able to promote healthy lifestyles and improve the community's health, we must adapt undergraduate medical education and postgraduate medical education (residency training programme) to systematically provide learners with instruction in population-based skills such as the process of Community-Oriented Primary Care (COPC) (Abrahamson, 1983; Institute of Medicine, 1984; Nutting et al., 1985; Nutting, 1987). COPC can be used as a potential model to outline the experiences students (undergraduate medical students and postgraduate residents) need to participate in caring for a community, as well as for individuals (Pickles, 1939; Lipkin et al., 1982; Hess et al., 1983; Prywes, 1983; Strelnick et al., 1986).

The qualifications necessary to participate in the COPC approach include: an interest in improving the community's health; the ability to define "community" through collection of vital statistics, the identification of the community's perceived health needs, visits to churches and community meetings, and visits to politicians, law makers and law enforcers;

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a willingness to collaborate with community members in health-related issues; and an understanding of epidemiological principles (Fraser, 1987; Mullan, 1984).

Student COPC Experiences

County Demographics

A rotation for fourth year undergraduate medical students at the University of North Carolina at Chapel Hill and third year Family Practice postgraduate residents at a University of North Carolina Family Practice Residency Program in Asheville, North Carolina is located at the Hot Springs Health Program (HSHP) in western North Carolina, a five hour drive from Chapel Hill and a fourty-five minute drive from Asheville, North Carolina. The HSHP is a comprehensive, county-wide health programme that provides primary medical and dental services to all the people of Madison County. The HSHP operates four primary medical centres, a dental centre, pharmacy services, a home health agency, and hospice services. The six physicians, one family nurse practitioner, one physician's assistant, 15 home health nurses, one dentist and one pharmacist provide services at the medical centres, the health department, the two nursing homes in the county and the local college infirmary. The physicians, the nurse practitioner, and the physician's assistant provide care on a rotating basis at all four medical centres, the health department, the nursing homes and the college infirmary. The medical centres are open during the evening and weekend for routine care, and the medical providers are available by phone at other times.

Madison County is a mountainous rural county with approximately 17,000 people, essentially all caucasian. No large industries exist within the county borders. People are involved with small plot farming, especially of tobacco, or employed by a local liberal arts college, the HSHP, or the local utility company. Many people also work outside the county. Fifteen percent of the population is over the age of 65, compared to the national rate of 11.2%. Forty percent of the elderly live below the poverty level. Five percent of the population is unemployed.

Development of the Student COPC Experience

In July, 1989 representative of the HSHP, the local liberal arts college, and the Family Practice Residency Program in nearby Asheville, received funding from the W.K. Kellogg Foundation to develop a Community-Oriented Primary Care Project in Madison County. A major focus of the award was the development of community-based and community-operated primary prevention programmes and the implementation of a student COPC experience.

Objectives of the Student COPC Experience

The main objectives of the student COPC experiences are to: 1) recognise the manifestations of disease in a community, its effects on individuals, their families and the community, and the available resources/services for these diseases; 2) develop a sense of "community" through first-hand experience with the people, community groups, services agencies, and through the acquisition of community-wide epidemiological data; 3) learn how to interact with community agencies or boards, in order to sort health needs, develop and monitor programmes; 4) apply the definition of "community" and the knowledge of available services to the individual patients seen during the rotation; and 5) complete a Community Project.

Implementation of the Student COPC Experience

Table I outlines the experience as it relates to the COPC process. The student defines and characterises Madison County by: answering specific demographic questions and morbidity/mortality questions; interviewing community people about their perceived health problems and needs; visiting health agencies, churches, and firefighter and community development club meetings; and talking with recognised community leaders and natural helpers.

Next, the student summarizes and prioritises the health problems and selects one to evaluate intensively. Then, to demonstrate the value of this population/community-wide information (the denominator), the student performs a case study with a patient representing this health problem from the HSHP practice. Information on the patient and family (the numerator) can be seen in relation to the community's experience with the medical problem.

The student then designs a hypothetical intervention or works with the Community Advisory Board on an ongoing intervention. If time permits the student can be involved with collecting evaluation data of an ongoing intervention. These interventions may be located within the HSHP or in the community, depending on the nature of the medical problem.

Half of each day is spent working with a physician in one of the four medical centres, the health department or the nursing homes. The other half day is spent collecting information about the community through existing sources of data, community opinion polls, visits with home health nurses to individual patients' homes, visits to service agencies and community meetings. At the end of the rotation, the student is expected to submit a written report that includes a description of the community and the existing health care system, a problem as perceived by the community or student, and a proposed plan of intervention for solving this problem, i.e. the Community Project.

A workbook has been developed to aid the students in their learning. The workbook includes: basic logistical information as to contact people, housing and directions to the site; objectives of the rotation; a tentative weekly schedule; a specific course outline; and student evaluation forms.

Defining and Characterising the Community

The course materials provide a list of questions that define and characterise the community using demographic data, morbidity and mortality data, patient opinion polls, available health care services, existing community groups, natural and elected leaders. Specific data

Table I. Madison County, NC. Community-oriented primary care (COPC) selective

1. Defining and characterising the community	
a. Demographic data	a. Collecting answers to specific demographic questions
b. Morbidity and mortality data	b. Collecting answers to specific morbidity/mortality questions; completing community and HSHP Practice worksheet
c. Opinion poll	c. Interviewing sample of community
d. Health care services	d. Listing services; visiting some agencies
e. Power structure - political leaders, natural helpers	e. Talking with political leaders, natural helpers; visiting church and community groups
2. Identifying community health issues	
a. Summarising data	a. Summarising above data
b. Prioritising health issues	b. Prioritising health issues individually and after attending a Community Advisory Board (CAB) meeting
c. Selecting a health issue	c. Performing a case study on an individual patient with the health issue of interest
3. Modifying or developing new health care programmes (or interventions) to address a priority health issue	
a. Collaboration between community and health care system	a. Designing a hypothetical intervention or working with CAB on an existing intervention
4. Monitoring the effectiveness of a programme and/or its modifications	4. Collecting evaluation data

sources, persons to be interviewed, and specific questions to answer are provided for the student.

Clinical experiences follow a standard ambulatory care format; first the student interviews and examines patients, followed by one of the HSHP physicians examining the patient for confirmation. The student also gathers information about the community and is expected to complete a "Community and HSHP Practice Worksheet" (Fig. 1) summarizing the age distribution, gender, risk factor profile, and leading medical problems within Madison County, within the Hot Springs Health Program practice, and among the patients personally seen by the student. This worksheet provides at a glance the similarities and differences among the patients seen by the student and those within the HSHP as a whole. County information is available through: a state-provided statistical summary entitled the County Data Book; a limited opinion poll conducted by the student with five patients at the HSHP and five patients at the County Health Department (Fig. 2 for the questions); and the Centers for Disease Control Behavioral Risk Factor Survey results for Madison County, listed in the County Data Book. The HSHP patient data is available through the computerised patient database; students have the opportunity to learn how to access age, gender, risk factor, screening preventive services, and diagnoses in the HSHP practice as a whole. Individual patients seen by the student will provide the comparative information required to complete this analysis.

Identifying the Community Health Issue(s)

After summarizing this information, the student will attend one or more meetings of the Community Advisory Board to watch the interaction between agency personnel and community lay people and to participate in the discussion of ongoing and newly developing interventions. The student then selects one health issue identified through his synthesis of the epidemiologic data and the opinion poll, an issue that is also of personal interest. The student describes the magnitude or scope of this health issue by estimating: the prevalence and/or incidence of the problem; the nature of the impact of this problem on rates of morbidity, mortality, disability, and hospitalisation rates; direct, indirect or intangible costs to individual patients with this problem; and the community's societal costs. Finally, the student comments on the existing types of health services available in the community to address this problem and current obstacles to using this health resource(s).

The student then selects a patient with this health problem from the HSHP practice through the use of the computerised problem-centred database. The student performs an in-depth case study through visits with the patient/family at home and at the workplace. The student also visits the agencies which the patient uses, to describe how the patient and his care exemplifies this health problem. The student will discover the chief complaint, the past medical history, family genogram, and the patient's health status (functional status, risk factors for the disease, health related behaviours, compliance with health care directives, and use of health services in the community). The case study exemplifies for the student how knowledge of the community, both from an epidemiological and from a sociological perspective, can add to the care for an individual patient.

	Madison County	Hot Springs Health Programme	Students/Residents Patients
Age			
Mean (yrs).			
< 1 yr.			
1 - 18			
19 - 65			
> 65			
Gender			
M (%)			
F (%)			
Risk factor			
% Smokers			
% High Blood Pressure			
% Hypercholesterolaemia			
% Seat Belt Users			
% Sedentary Lifestyle			
Leading Medical **Diseases/Problems**			
1.			
2.			
3.			
4.			
5.			

Figure 1. Characteristics of community and practice worksheet

Modifying or Developing New Health Care Programmes (or Interventions)

Then, based on the analyses of the community, patient and family, the student proposes specific solutions, interventions or treatment strategies for dealing with that health problem. These solutions must be appropriate for the community and must rely on feedback from the physician-mentor, health agency personnel, elected or appointed local officials, and community lay people. At any one time the Community Advisory Board is involved in two or three intervention programmes, and the student may elect to participate

1. What personal health problems or physical complaints appear to be most commonly mentioned by people in the community?

2. What barriers to health care or medically-related issues do people in the community talk about?

3. What in your opinion are the serious health problems in the county;

   What are the causes of these problems; and

   What in your opinion are the serious barriers to meeting these health needs?

4. What needs to be done to handle these problems?

5. Do you feel that there is any group of the population not receiving adequate medical care? Why not?

(This questionnaire may be reproduced as many times as needed for interviews).

Figure 2. Patient interview questions about health needs and services in Madison county

in the planning and implementation of some aspect of these interventions. The student synthesizes these findings and proposals into a typed eight to ten page report, known as the Community Project. A sample report is included in the workbook.

Logistics of the COPC Rotation

This COPC curriculum was designed during 1989 and 1990, and the first students were welcomed in the Summer of 1990. The University of North Carolina School of Medicine provides undergraduate medical training for 160 students in each year of the four year course. The first two years provide basic science training and the third and fourth years provide clinical experiences. The COPC rotation is an optional four week rotation for fourth year students. The HSHP felt that with the current workload for their physicians they could provide adequate teaching for only one student a month for a total of twelve students a year.

We estimate that one student requires twenty percent of the physician's time. In addition, the community opinion poll consumes up to thirty minutes for each of ten patients; the visits to health agencies, such as the Department of Social Services or the Mental Health Center, and visits with community leaders require at least one hour per visit. We recognise that certain health agencies and community leaders could potentially become overwhelmed with student discussions; to avoid this we suggest certain agencies and leaders on a rotating

basis, so that no one person is called upon more than once a year. The community opinion poll is conducted on ten randomly selected patients per month; it is unlikely that the same patients will be asked more than once in any one year.
In July of 1991 we started to offer this COPC experience to postgraduate Family Practice residents in their third year of a three year Family Practice Residency Programme. We have thus one undergraduate fourth year medical student and one third year resident present simultaneously. Residents in their final year require minimal supervision from the physician-mentor in comparison with undergraduate medical students.

This COPC experience is administered by the Hot Springs Health Program. Students live either at a local inn within the county or in the dormitory of the local liberal arts college during their four-week experience. They are required to pay for their travel expenses within the county and for their meals.
One of the physicians is responsible for introducing the student to the practice and assigning one physician-mentor to the student to work with on a daily basis. The physician-mentor, with the assistance of the Data Management Supervisor for the HSHP is responsible for training the student in the use of the computerised database. Currently, the W.K. Kellogg Foundation is providing financial assistance to the HSHP for the implementation of this COPC experience. The University of North Carolina provides the reimbursement for housing and travel to the site.

The student completes the self-directed learning tasks in the workbook each week and reviews these with the physician-mentor. The student's final grade of Honors, High Pass, Pass or Low Pass is determined by the mentor commenting on the clinical patient care activities (50%) (Fig. 3), the written Community Project (40%), and the final oral presentation of the Community Project to the HSHP (10%). The student is expected to complete an evaluation of the rotation by commenting on the overall benefit of the experience, the quality of the preceptor's help, and the value of the Community Project (Fig. 4).

Community Responsiveness

Woven through this student experience is the persistent theme of striving to know the community through the collection of existing health care statistics, perceived health needs, individual and family case studies, and the personal interaction with health agencies/ personnel, the Community Advisory Board, and people in the community. The experience of gathering information and interacting with community agencies and people offers the student a broad perspective in which to place the health problems and needs of their individual patients during this selective, i.e. the denominator view rather than merely the usual numerator view of medical problems. This experience of clinical patients informed by denominator-data is a unique opportunity for the student to understand the value of gathering such information in order to help an individual patient.

These experiences have the potential to benefit the patient, family and the community. The patient and family can benefit through a more expedient use of ancillary health services and through more appropriate medical referral. The community can benefit when a health care provider promptly recognises epidemics, notices gaps, or redundancy in medical services, and thus provides a more streamlined medical care delivery system.

The students can provide valuable information to the Community Advisory Board. This Board is already informed about the county epidemiological health data and the results of a large community and health professional opinion poll conducted in the fall of 1989. However, the students can update the Board on the changing perceptions of health needs from their limited patient opinion poll, the results of the patient case studies, and their discussions with community leaders and groups. The students' recommended solutions/ interventions for the selected health problem are reviewed by the Board and used when, and if the Board implements a programme to address that health problem. The students are actually a part of our overall and ongoing evaluation of the COPC process within the county.

The students begin to understand the views of community leaders or agencies who will support or hinder changes in, or the development of new health programmes. Through discussion with various community people, community groups, and the Community Advisory Board students come to recognise the potential difficulty and perhaps the value of becoming involved in community policy-making.

Conclusion

We have developed in a rural Southern United States mountainous county a COPC Project incorporating the primary health service delivery system, the Hot Springs Health Program, and a newly composed Community Advisory Board. The Community Advisory Board sorts health problems and designs/implements community-based and HSHP-based interventions. Students are able to experience the COPC process through specific self-directed learning tasks and interactive sessions with health care professionals in the HSHP, members of the Community Advisory Board, and lay people in the community. The students' experience, including both patient clinical experiences and the Community Project, has been designed to fit into a standard four-week time period.

This COPC experience consists of direct patient clinical experiences within the framework of learning about the health of the whole county. Additionally, the experience provides practice with the principles of COPC. Students learn what data to gather about a community, where to access this information, how to define perceived health problems with people in the community, how to work with community groups, and how to treat patients within this community perspective. Only through such learning experiences will students develop the attitudes and skills they need to practise medicine with a community perspective.

Student name: Mentor name:
Date of elective:

Considering the student's stage of training, rate his/her development with respect to each of the following areas. Please make any detailed comments below each item.

1. Ability to collect data pertinent to diagnosis and management of common problems in ambulatory patients, their families and their community.

5	4	3	2	1
Consistently obtains necessary information through patient interview, examination and appropriate use of tests	Frequently obtains all information	Occasionally obtains all information	Seldom obtains all information	Consistently unable to obtain pertinent data

Comments:

2. Knowledge and skills in the primary management of common problems in ambulatory patients.

5	4	3	2	1
Consistently able to evaluate and plan management for patient problems	Usually able	Occasionally abl	Seldom able	Consistently demonstrates inadequate evaluation and management ability

Comments:

3. Evaluation, education and treatment of patients and their families, utilising knowledge of socio-economic and psychological factors.

5	4	3	2	1
Always manages patient problems comprehensively	Ususally done	Often done	Seldom done	Displays a consistent disregard for aspects of patient care

Comments:

4. Ability to provide continuity of care for patient problems, when needed.

5	4	3	2	1
Established and carries out appropriate follow-up for all or almost all problems	Usually done	Often done	Seldom done	Consistently unable to provide follow-up care

Comments:

5. Quality of function within the health care team in the community.

5	4	3	2	1
Exhibits superior ability to participate in patient care with nurses, staff, and community agency representatives	Exhibits good ability	Exhibits satisfactory ability	Exhibits marginal ability	Functions poorly with the other members

Comments:

6. Utilisation of medical resources in your area, including consultants, hopitals, social agencies, paramedical personnel, etc.

5	4	3	2	1
Shows superior ability to select and utilise other resources, when needed	Shows good ability	Shows satisfactory ability	Shows marginal ability	Poor recognition of need and utilisation

Comments:

Following your four weeks of precepting, you and others in your practice have a unique opportunity to evaluate the student's clinical and personal abilities in your setting.

7. What are the student's particular strenghts?
8. What areas could use some improvement?

9. If you would like to recommend this student for the grade of "honours", please attach a letter describing your specific, detailed reasons for judging him or her outstanding. Also, attach a letter detailing your reasons for an "unsatisfactory" grade.

Signature of mentor completing
the above evaluation form

Figure 3. Community-oriented primary care evaluation by mentor

Date of Evaluation	Student Name

Your mentor and the COPC faculty are interested in your perceptions of the clerkship you have just completed. To aid us in maintaining or improving the quality of your educational experience, your candid assessment of your experience is a valuable tool in evaluating the programme.

	Very Much	Much	Moderate	Little	None
1. Overall, how much medical knowledge did you gain	1	2	3	4	5
2. Was it beneficial to learn about the community in which one is to practise medicine	1	2	3	4	5

How often did you:	Always	Usually	Sometimes	Seldom	None
3. Get involved in patient management	1	2	3	4	5
4. Receive supervision from your preceptor	1	2	3	4	5
5. Receive teaching or instruction from your zpreceptor	1	2	3	4	5

	Definitely Yes	Probably Yes	Not Sure	Probably No	Definitely no
6. Knowing what you do now, would you recommend this rotation to a classmate?	1	2	3	4	5

How would you rate your perceptor's help to you with respect to the following areas?

	Excellent	Good	Average	Fair	Poor
7. Understanding the process of preventive medicine and health maintenance	1	2	3	4	5
8. Understanding the roles of family members in health, illness and patient management	1	2	3	4	5

9. Understanding the need for continuity of care in patient management	1	2	3	4	5
10. Understanding the need for continuing education after you are in practice	1	2	3	4	5
11. Understanding of the patient referral process	1	2	3	4	5
12. Understanding the economics of office practice	1	2	3	4	5
13. Understanding the role of community agencies (e.g. Health Department and Department of Social Services) in the practice of medicine and provision of health services	1	2	3	4	5
14. Increasing your ability to identify and use community agencies in patient management	1	2	3	4	5

How would you rate your rotation with respect to the following areas?

	Excellent	Good	Average	Fair	Poor
15. Amount of time your preceptor made available to you to discuss aspects of the clerkship	1	2	3	4	5
16. Amount of feedback you received from your preceptor on the quality of your performance and/or possible ways of improving your skills and knowledge	1	2	3	4	5
17. Variety and quantity of primary care conditions observed during the preceptorship	1	2	3	4	5

18. Amount of time spent working with health professionals in the community health agencies	1	2	3	4	5
19. Opportunity to discuss current local health care issues with your preceptor	1	2	3	4	5

If you wish to qualify any of the above answers, please use the following space.

20. If you were ready to enter medical practice, list in order of importance those factors which you and your family would consider regarding a practice in this community.

21. What do you consider to be the strong points of this educational experience?

A.
B.
C.
D.

22. What do you consider to the be weaker points of this educational experience?

A.
B.
C.
D.

23. How did this experience compare educationally with your previous medical training?

24. What suggestions would you make for changing this clerkship?

Figure 4. COPC selective evaluation

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Organisation of a Community-Oriented Faculty

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Abstract

A community-oriented medical school is described where the entire traditional hospital clerkship curriculum is provided by trained, committed, community physicians and all the out-patient community practice curriculum is provided by full-time academic physicians operating in university-owned practices. The focus of the paper is on the part-time teachers. We suggest that there are physicians in every community, who, if recruited, can be trained to create and teach a medical school curriculum. The attitudes of these physicians toward salary for teaching and toward the importance of teaching in their careers are discussed.

Introduction

The past sixteen years have afforded us the opportunity to observe a medical education programme that uses full-time academics for out-patient experiences and part-time community physicians (salaried and non-salaried) for inpatient clerkships. We feel that this model has merit and may be applicable to other community-oriented medical schools.

In Rockford, the outpatient experience is continuous and lasts 30 months starting in the second year and lasting until graduation. The supervised students follow their own panel of patients. This means that families are assigned to the students, and, except for emergencies, the patients in that family are scheduled to see that student when they are sick. The hospital clerkship experience is 36 months in duration and begins in the second year with the Introduction to Clinical Medicine and Physical Diagnosis courses. The students are allowed to absent themselves from these courses and from the subsequent hospital clerkships for two half-days per week to participate in their outpatient clinics.

Our experience has led to the following theses: 1) each community has a cadre of practising physicians who have the ability and are willing to make the commitment to create and teach a medical school curriculum; 2) hospital curriculum can be taught totally by practising community physicians (who have access to practice in the hospital); and 3) continuous outpatient clerkships function well when taught by full-time academics.

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The University of Illinois regionalised its medical education sixteen years ago. The original school remained in Chicago, and three additional sites were developed. The school in Chicago, with its yearly intake of 160 students, has maintained a traditional four year curriculum. The 140 students at the three other sites have their first year at Urbana and then either remain in Urbana or go to Peoria or Rockford. There are 50 students per year, for three years, at Rockford.

The Rockford site is 150 km from Chicago and has a metropolitan population of 250,000. It is 350 km from Urbana and 250 km from Peoria. Rockford has three private hospitals, and all three have signed agreements to provide resources and patients for teaching. These hospitals are not owned by the University. The total teaching staff of the school consists of 400 physicians, but only 30 are full-time with the University. The Department of Medicine has eight full-time physicians. One is the Chairman of the Department and he remains in clinical practice within the community. Two are retired physicians from the community who have the time to give individual tutoring to the students. The remaining five are assigned as practising physician-teachers in the university-owned out-patient clinics where the students have their 30 month continuous experience. The rest of the Department teaching staff, 130 in number, are part-time salaried or non-salaried members of the Faculty.

Definition of Community Orientation

The Rockford version of medical education uses community resources as its driving force. The community physicians develop and teach the curriculum. The community hospitals provide their facilities for teaching clerkships. Community leaders in government, religion, industry, business, social services, and education determine and teach that portion of the curriculum that is concerned with the skills needed to practise primary care medicine within a community. The University provides outpatient clinics, staffed by full-time academics, who give students an extended outpatient learning experience.

Teaching Staff (Department of Medicine)

The full-time faculty members, who teach in the university-owned community practices, where the medical students have their continuous out-patient clerkship, are career educators. Their focus is on the delivery of medical education in the outpatient setting. Their large teaching and clinical service responsibilities make it necessary that they have a support team that assists them in advancing their academic career. This means that medical educators or clinical research specialists must be assigned to work with them in their clinical setting, much like bench laboratories would have research assistants, in order for significant academic productivity to go on. Their salary is a combination of university salary and monies from clinical practice.

The members of the part-time teaching staff fall into four categories depending on their level of commitment (Figure 1). The first group is classified as "educators", and are committed to learning and thinking about curriculum development, evaluation of students, re-mediation, etc. They function as departmental leaders and planners. The members of the second group are "committed teachers" - they allow students to be with them at all times during their practice and they give lectures, seminars, and patient presentation conferences whenever they are asked to do so. Those in the third group are "occasional teachers" providing at least one teaching function during the year. The fourth group is called "inactive". The Department's rules state that teachers can remain "inactive" for three years. After that time, they must either resign from the Faculty or again participate in teaching activities.

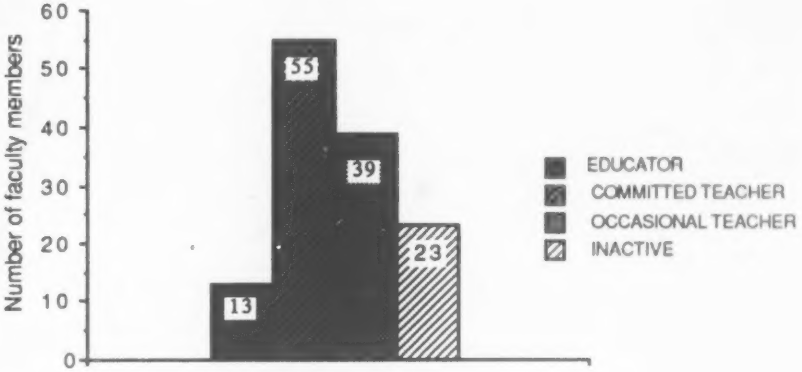

Figure 1. The number of part-time faculty in each category

Community Physician Commitment

Experience has shown that it is necessary to appreciate a number of concepts before developing a Faculty of committed community physicians. These are:

1. Recognise from the beginning that there are varying levels of desire to teach among community physicians. Those that want to make a commitment need to be identified and recruited. The goals of the teaching programme and the opportunities that are available in the school need to be explained to them on an individual basis. Figure 2 demonstrates the results of a survey of salaried members of the Faculty. The 77% response shows that there are many who consider the medical school appointment important to their careers. This demonstrates that there is a cadre of practising physicians who feel that involvement with the medical school is important.

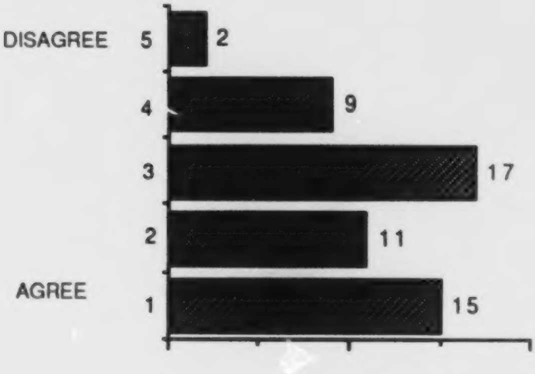

Figure 2. My teaching appointment is important for my career plans

2. Job descriptions are necessary at every level of responsibility within the Department of Medicine. Clinicians need to know exactly what is expected of them, so that they can adequately judge whether their skills and practice styles fit these expectations. The following outline shows the positions that are available in the Department of Medicine and some of the job descriptions:

Educator

These faculty members will have one of the positions listed below. Each of the positions has a detailed job description.

Discipline Division Chairman (Cardiology, Nephrology, etc.)
Continuing Medical Education Coordinator
Evaluation/Re-mediation Coordinator
Research Coordinator
Post Graduate Education Coordinator
Physical Diagnosis Course Coordinator
Introduction to Clinical Medicine Course Coordinator
Medicine Clerkship Coordinators.

Committed Teacher

a. May have students assigned for the entire year.
b. Must participate, on a rotating basis, in the physical diagnosis curriculum.
c. Must participate (when asked) in lectures, conferences or seminars.
d. Must participate in at least one standing medical school committee.
e. Must be responsible for regularly submitting and revising examination questions.

Occasional Teacher

a. Must participate in at least one medical school or teaching assignment per year.

b. The teaching assignment may be determined at the convenience of the Faculty member.

Inactive

a. A person may choose to cease medical school activity entirely.

b. He or she may remain in this category for three years.

c. After three years, if no activity is re-instituted, the faculty appointment will be terminated.

3. Salary is important to private physicians who commit themselves to being educators or committed teachers (Fig. 3). The survey shows that a significant number of the salaried physicians consider payment for teaching activities to be a necessity. In addition, the signing of a yearly contract is essential. This ensures that the salary goes with the position and not with the person, and that the amount is renegotiated each year. This prevents all the income from going to persons with seniority, as the effect of the annual university salary raise, on each individual's salary, is eliminated. It is also important to have an "inactive" category for part-time Faculty members, because there are many other potential, yet temporary commitments in medical practice. For example, someone might be elected Hospital Staff President. The individual teacher has to have a dignified way to be released from teaching for a period of time.

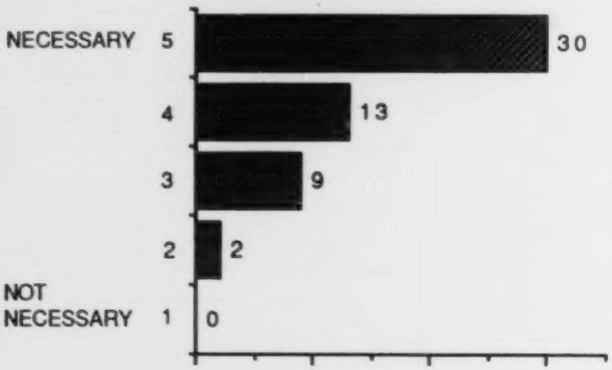

Figure 3. Is salary necessary?

4. The educators among the part-time staff of the Faculty must design the curriculum and bring it to the committed and occasional teachers for their approval. Faculty teacher training sessions should be very practical, as the teachers want information and techniques that will help them with their day to day teaching responsibilities with students, not

educational theory. Working sessions function best at 7:00 a.m. for breakfast, or 6:00 to 8:00 p.m. for supper. Longer training sessions or workshops begin at 10:00 a.m., include a working lunch, and finish by 2:00 p.m. This permits the physician to make morning and afternoon patient rounds.

Cost of the Part-Time Faculty

The Department of Medicine funding for teaching staff is about one-half of the total Rockford site Faculty budget. The funding for the 130 part-timers shown in Figure 2 is one-third of the departmental budget and therefore one-sixth of the total Faculty budget. We feel that a full-time staff, large enough to deliver our curriculum, would be far more costly for the School. There is no part-time Faculty member, even the most committed in the "educator" group, who earns more than 15% of his or her income from teaching; most earn less than 5%. We have found, that if someone accepts money, no matter how small the amount, for an important responsibility, such as educating medical students, the person is likely to take the task very seriously. "Education" time, particularly for those who head divisions, or curriculum segments, can approach 10 to 20 hours per week.

Student Outcomes

After sixteen years of experience with our community-oriented teaching staff there are several questions that should be answered. Do the students perform as well in national examinations as those in a traditional curriculum, and do more of them go into primary care residencies? Figure 4 shows that our students perform consistently as well as students who attend the more traditional curriculum at the Chicago site of the College of Medicine. Figure 5 shows the percentage of Rockford students who have gone into primary care residencies each year since the first class graduated in 1975. The percentages are compared with the USA national averages for the past seven years. The results show that there is no obvious influence of our curriculum on the choice of career by students.

Conclusion

In this model of organisation for a community-oriented medical school part-time community physicians are recruited and trained to provide the leadership and teaching for a complete clinical curriculum. Most of the full-time physicians at the school are concerned with teaching in a continous outpatient curriculum. The two groups of teachers work together, allowing students to pass back and forth between experiences, so that a coordinated, complete, community-oriented curriculum is formulated. This model allows the University to introduce relevant clinical material relating to community medicine without the expense of supporting large numbers of full-time physicians. The financial rewards for the committed part-time physicians are small but the opportunity to participate meaningfully in the scholarly process and the prestige and satisfaction this brings is enough reward to ensure continued commitment.

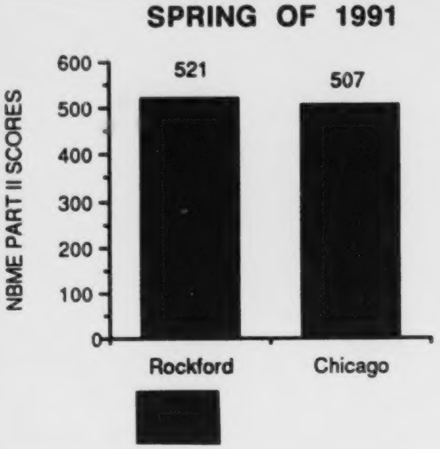

Figure 4. Comparison of fourth year clinical examinations between Rockford and a traditional school (U of I at Chicago)

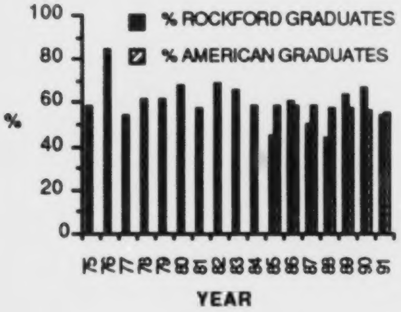

Figure 5. Percent of Rockford students entering primary care residencies compared to all American graduates (1985-1991)

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The Rural Residency Course

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Abstract

This paper presents the student and graduate experience of the rural residency course which aims to improve the performance of doctors in rural hospitals.

A questionnaire was distributed to the final and penultimate final year students, and to graduates working at the Wad Medani Teaching Hospital. The response rate was 57%. The results have shown that the course was well received by the students and graduates. Positive educational experiences were mentioned by both students and graduates. Problems facing this course and how these may be resolved are discussed.

Introduction

Sudan is the largest country in Africa with an area of one million square miles. As one of the least developed countries, Sudan exhibits all the features of poor development, such as a high birth rate, high infant mortality rate, rapid growth and low gross national product, as well as predominance of epidemic and endemic infectious diseases. The majority of the population live in rural areas (75%) and 11 % are nomadic. Yet more than 80% of the doctors work in big cities, predominantly in the capital city, serving only 14% of the total population.

This problem is mainly due to undergraduate education which is focused primarily on practice in big teaching hospitals. These hospitals are relatively well equipped and staffed. The health problems dealt with by these hospitals do not represent the commonest problems in the community; they are just the tip of the iceberg. A doctor with this background, when asked to work in rural areas, finds that he is inadequately prepared to perform the tasks that are required of him, let alone be able to contribute to the improvement of rural health services. These tasks include supervision of all primary health care units in the catchment area. In addition he will be responsible for managing his own hospital, including staff, equipment and finance. These duties require administrative and managerial skills which he lacks. In most cases the doctor either delegates these responsibilities to senior auxiliary staff or becomes frustrated while waiting eagerly to finish his compulsory one year rural residency period. The only motivation for him to stay is the permission to pursue postgraduate studies.

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The Gezira Medical School was established in 1978 and adopted an innovative curriculum based on problem-based, community-oriented and community-based education. Emphasis is on primary health care and rural health. With this background the school addresses the above human resource problem through a variety of educational activities. One important activity is the rural residency which aims to improve the performance of doctors in rural hospitals.

The Rural Residency

The course is offered to semester 7 students after they have studied all the body systems in integrated blocks. This one month course is designed to expose the students to real life situations in rural areas and to the nature and responsibilities of the physician working in a rural hospital.

The course objectives are attained by students observing, assisting, or performing different activities in the rural hospital and other health facilities in the area, community.
In the rural hospital the students observe, assist, or perform different clinical and laboratory procedures in a real life situation with the limited resources that are available in the rural hospital. These activities are performed under close supervision by the doctor in charge. The students may also live with the doctor or other senior health personnel and work closely with them in service administration and management activities.

The students are also exposed to working situation in other health facilities, including health centres and primary health care units. The students are expected to appreciate that health services are rendered at different facilities by different health personnel working as a team.

The students carry out a community-based survey addressing a priority health problem or health related problem. The purpose is to train the students in the application of criteria for selecting a priority problem, as well as to design, conduct and analyse a survey. In addition, students write a final report in which they describe their experience at the rural hospital.

The course is preceded by a workshop in which students, staff and government officials participate. The workshop discusses course objectives, logistic support and evaluation of the course. The students choose their hospital, and only one or two students go to each hospital. The university offers a transport and catering allowance. Accommodation is the responsibility of the host hospital and of community leaders in rural areas. The course was offered for the first time in 1981. Since then ten rotations have been conducted.

Methods

A questionnaire was distributed to the final and penultimate final year students, who had completed the course, and to all Gezira graduates who were working at Wad Medani Teaching Hospital; some of the graduates completed their rural residency assignment as doctors. 80 students and graduates responded to the questionnaire, a response rate of 57%. Structured long interviews were conducted with a few students. Also the personal experiences of the first author as former student and the second author as course coordinator were further sources of information.

The questionnaire covered organization of the course, attainment of the objectives, students' perception of the educational impact of the course, and graduates' perception of the educational impact of the course on their performance at rural hospitals. The response to each question was rated from 1 to 5, where 5 represented strong agreement.

Results

54 (66.7%) of the respondents were students and 26 (23.3%) were graduates of whom 15 had completed their rural residency as newly qualified doctors. 63% were males, and 37% were females. The combined mean responses and the standard deviation for each question are shown below.

	Mean	**SD**
I. Course Organisation		
Enough help from the course coordinator	2.7	1.3
Enough help from the doctor at the rural hospital	4.1	1.0
Duration of the course was adequate	3.5	1.3
Adequate allowance	1.7	1.2
II. Course Objectives		
Clarity of objectives	3.6	1.2
Relevance of objectives		
Recognition of the role of the doctor in the rural hospital	3.5	1.4
Recognition of the role of the rural hospital	3.2	1.2
Familiarity with the rural hospital environment	3.8	1.1
III. Educational impact on students		
Learning community interaction	3.7	1.3
Learning team work	3.6	1.2
Mastering skills (manual and communication)	3.8	1.9
Learning research skills	3.1	1.3
IV. Educational impact on graduates		
Help in the rural hospital as a doctor	3.6	1.3
Performed less well as a rural doctor if s/he did not participate in the rural residency course	3.1.	1.1
Better performance compared with non-Gezira graduates	4.2	0.9

Discussion

There was no significant difference between the responses of students and graduates. The above results indicate that this course was well received by the students and graduates who responded to the questionnaire. Positive educational impact was mentioned by both students and graduates. The reasons behind the interest shown by these students may well have been this enhanced opportunity to practice the skills they had learned; many respondents mentioned that this had been the first time for them to perform particular skills, e.g. abscess drainage, paracentesis.

Although gender was not an important factor, there had been some difficulties with the accommodation of female students in small rural hospitals. All the respondents complained about inadequate subsistence allowance. Some of the doctors in the rural hospitals were not interested in helping students and considered this task an additional workload. This aspect was compounded by the rapid turnover of doctors in rural hospitals. As Sudan is a large country with many transport problems, some of the students had to travel from 4 to 6 days to reach their hospital. This greatly handicapped the students' supervision by Faculty staff members. This was obvious from the low rating when the students were asked about help provided by the staff coordinator.

However, this course represents the third phase of the community-based experience, and the main educational aim is to give students autonomy and responsibility and to provide less support from the staff when compared with the students' two earlier experiences. As with other community-based courses, assessment was a problem. Variability of facilities at rural hospitals and of the doctors' interest in helping students prevented standardisation and create an element of subjectivity.

Conclusion

Suggestions to solve these problems include the assignment of students to hospitals where Gezira graduates are working, as these graduates are orientated about the course objectives and their assessment. This would hopefully improve the quality of supervision and assessment. Also, students should be encouraged to choose rural hospitals with ready access to transport and accommodation facilities conducive to proper supervision and follow up.

It is here important to mention that this study has only evaluated the students' and graduates' satisfaction with the course. It did not assess the actual impact of the course on the performance of graduates in rural hospital which is the ultimate goal of the course. This is an area for further research.

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The Training of District Medical Officers: A Methodology Tested in Senegal*

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Abstract

The training of Senegalese doctors is similar to that of doctors in developed countries. It does not prepare them well for the responsibilities of a district medical officer - a role of crucial importance to public health services and particularly to the optimal use of scarce resources. To compensate for this deficiency in training, the Thiès project has developed a programme for teaching district medical officers already in service how to organize health delivery systems. This three-month programme consists of a series of modules aimed at finding solutions to frequently encountered health service delivery problems, followed by a period of on-going training in the form of supervision in the field. The objective of the course is twofold: to have an immediate impact on the quality of health service delivery; and to motivate the doctor in his work which, until now, has only required the use of his academic training in the area of clinical practice. This article describes the methodology used in the initial three-month stage of this training programme.

Introduction

The Thiès Project

The objective of the Thiès project is the improvement of primary health care and its supporting referral structures, in the context of a clearly understood programme of community participation (Equipe du projet de Thiès). The project has been implemented by the Institute of Tropical Medicine in Antwerp, under the auspices of Senegal's Ministry of Public Health, and is financed by WHO. Activities include the initial training of district medical officers, their supervision in the field (which is seen both as in-service training and as management assistance), operational and action research in order to adapt national public health programmes and better integrate them into existing structures, and, finally, assistance in planning at the central Ministry of Public Health level. This article describes the objectives and methodology of the initial three-month training period.

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Responsibilities of a Doctor in Charge of Medical "Circumscription"

The medical 'circumscription' is the Senegalese equivalent of a medical district (OMS Bureau régional pour l'Afrique, 1985), which includes a health centre (a small hospital), a network of outlying dispensaries called health posts, and the administrative structures of these facilities. The medical district coincides with the Senegalese "departement" (unit of local administration). Not too long ago, the responsibilities of the district medical officer were still limited to curative treatment, the administration of the services of the health centre, the administrative control of the medical district and the management of the budget allotted by the government. These responsibilities are currently being redefined in order to encompass all the implications of a policy of primary health care. (WHO, 1978) Health posts should be responsible for a clearly defined section of the population and provide more services than they do at present. Apart from curative treatment and vaccinations, they should be responsible for patients suffering from tuberculosis, leprosy or malnutrition; they should also provide antenatal and well-baby clinics, and offer family planning services. Community participation should be encouraged by the health posts by promoting non-medical factors that contribute to health - such as environmental sanitation, clean water supply and nutrition.

Referral facilities should be reserved for the treatment of conditions that are too complex to be handled within the scope of primary health care, thus leaving primary treatment to the health posts. Medical officers need to know, therefore, how to mobilise the necessary human, material, financial and technical resources in order to allow the entire system to function in such a way. They require a complete overview of the health systems towards which their districts should be working. There is a long way to go before this is achieved.

Inadequacy of Basic Medical Training

In developing countries - as indeed elsewhere in the world - only very slow progress has been made in adapting the medical curriculum to health service delivery needs (WHO, 1985). Fewer than 5% of all medical schools have community-oriented programmes or provide future doctors with training that truly corresponds to the health problems of the people for whom they will be caring (Fülöp et al., 1984; Katz et al., 1981). All the efforts by medical schools throughout the Third World to gain recognition for their degrees in the more developed countries raise questions about the resulting brain-drain, the waste of resources and the irrelevance of the skills taught to the realities of local facilities (Pathik et al., 1980). Only in rare cases have praiseworthy attempts at modifications in the medical school programmes been made in an attempt to reduce the emigration of trained doctors and to facilitate their reassignment to rural areas (Buri et al., 1980).

Shortly before the beginning of the project, a brief survey of 28 district medical officers in Senegal emphasized their expressed need for supplementary training in management, planning, technical supervision, statistics and epidemiology. Are there more shortcomings in university training than we know of?

Clinical decision analysis (Weinstein et al., 1980) is the methodology that would allow the cost factor to be taken into account in order to remodel the clinic with the aim of optimising the use of scarce resources rather than simply maximising its effectiveness. It is the essential component that is still missing in the clinical training of doctors in developing countries. Other factors that are also often neglected in medical training include:

* how to render medical tests and treatment operational;
* the relationship between the therapist and his patient; this is often not sufficiently analysed, whereas prescriptions, which can be standardised, are imagined to be absolutely specific to one patient.

What, then, can be said about the teaching of public health? It most often takes the form of a course on the epidemiology of tropical communicable or deficiency diseases based on the otherwise appropriate model provided in the manual edited by Benenson, "The control of communicable diseases in man" (Benenson, 1975). The themes of insufficient sanitation and health education are recurrent in these courses. Although this approach is not entirely wrong, it is not very practical: behaviours that are questioned can, in fact, often be justified given their conveyed symbolic values, and the environmental constraints. (Obeyesekere, 1979; Connor et al., 1986) Furthermore, sanitation, which is considered a *sine qua non* for the improvement of general health conditions, is only incidentally the responsibility of the health services, especially in urban contexts.

This dichotomy between clinical or public health training and practice leads to a lot of frustration, waste and ineffectiveness. It represents the gap that the Thiès project has tried to bridge.

Objectives of the Training Offered in Thiès to Compensate for the Shortcomings of University Training

Imagine a doctor newly assigned to a CM (medical district). He is immediately overwhelmed by primary consultations while the patients desert the departments run by the nurses, where they are convinced they will only get prescriptions that they cannot afford, and treatment by a "doctor's underling". This lack of confidence is expressed through limited participation in preventive health activities, not to mention promotional efforts. Little by little, this doctor discovers that financial resources are poorly managed and/or stolen, that the health personnel are dissatisfied, and that the administration is both heavy and bound by routine. Even in his medical practice, he becomes frustrated by the lack of diagnostic and therapeutic tools.

How can training help this doctor overcome these all too real situations?

* by restructuring clinical training in accordance with the principles of clinical decision analysis (see above);
* by analysing health service activities:

The detection of which diseases should receive priority in primary curative medical

examinations?
How should they be handled?
What should be the content of antenatal care that does not follow blind routine?
What should be done with a child who is at risk from malnutrition?
Which priority diseases should referral medical facilities be designed to handle?

- by describing the organisation of departments responsible for delivering the above services, and for the management of resources;
- by introducing a research component in the management procedures taught;
- by understanding community participation not simply as a possible source of manpower that can be mobilised through the use of appropriate propaganda, but as representing an ethical responsibility and a point of reference.

These are, essentially, the objectives of public health training in Thiès: learn to identify the problems inherent in the above areas; find and evaluate solutions to them.

Teaching Methodology

Paedagogical Options

First of all, it should be stated that the course is largely inspired by proven ideas from the Master's in Public Health Programme offered by the Institute of Tropical Medicine in Antwerp, "The international course in health development" (Mercenier, 1973).

Teaching Based on Problem-Solving

CM (medical district) doctors passively endure poorly qualified personnel, shortages in drugs, and financial deficits largely because they are not able to perceive any solutions to these problems. These shortcomings, and the resulting inaction, are not inevitable; the pleasure an intellectual draws from his work is largely determined by how much his knowledge and training are utilised. But the Third World doctor sees the shortages of materials as an insurmountable constraint. He or she rarely treats these problems as being worthy of analysis or scientific response, because doctors have never been trained to examine them in such a way.

Furthermore, assiduity is a problem when teaching adults. In situations where coercive measures are not used, only the interest of the adult pupils can provide sufficient motivation for them to continue attending courses on a regular basis. This can be achieved by proposing solutions to the real problems they face every day.

In order to respond to all of these concerns, a training approach based on systematic problem solving seemed to us to be the most appropriate; such training provides a response to the experiences of our target audience, highlights the reasons behind their possible inactivity, the constraints of teaching adults and, above all, emphasizes our central concern for improving the performance of the health services.

A Modular Structure

The problems encountered by a district medical officer can be classified according to the level of services, the activity, or the resources being considered. Each of these categories includes a number of problems whose solutions are interrelated. To give two examples, the problems involved in caring for a woman during pregnancy and labour, while also protecting the newborn baby from tetanus, are all related to antenatal visits and the improvement of obstetric services; access to cash supply depends on having appropriate means and sources of financing as well as a solid system of accounting and control. It is the interlocking between groups of solutions related to the same practice that has led us to adopt a modular approach in the training we provide.

How are the Modules Designed?

The structure of all the modules is more or less the same, as the prime goal is one of problem solving. It can be summarised as follows:

* Guidelines are distributed outlining information to be gathered from the observation of health agents at work, the study of documents, and interviews with patients and health personnel. These observation guidelines are designed to reveal the dysfunctional aspects of the health services, areas for possible improvement and the unique characteristics of the services involved. The guidelines were prepared by developing questions about the quality of the health services (their effectiveness, efficiency, acceptability, and accessibility) and by working out the means of responding to these questions at each facility to be observed. These guidelines have proved to be particularly useful since the doctors who used them were out of practice in observing, and were no longer particularly struck by the anomalies of their daily environment.

* The actual observation is done in small groups so as not to interfere with the activities of the health facilities. Following each visit, participants share their observations in a plenary meeting. During these meetings, trainers provide the theoretical framework for possible solutions: this differs from giving ready-made formulae in that the discussion of problems is raised to the theoretical level, alternatives solutions are proposed, and the type of research to be done in implementing these solutions is identified. It is sometimes necessary to allocate additional time for lectures on fundamental sciences as these can be helpful when designing solutions. For example, lectures on risk theory and how it is measured are necessary for the organization of antenatal care; descriptive statistics are useful when looking at the epidemiology of malnutrition, as are test sensitivity and specificity in the organisation of the health centre laboratory, a set chapter on planning in the preparation of district planning, and elements of sociology in the family planning programme.

* The next stage consists of writing a health policy document that describes firstly the problems related to a given activity (e.g., the high number of patients who abandon treatment for leprosy); secondly, the analysis of various solutions (e.g., should the campaign against leprosy be integrated into the activities of the dispensaries, or should mobile teams be maintained?); and, thirdly, the appropriate choice.

* The participant then goes on to develop a strategy which specifies how the chosen solution will be implemented (*who, when, where* and *how*). Exercises in which participants are asked to quantify the elements involved in the solutions makes it possible to adapt the chosen solutions to the specific context of each district (e.g., how much would it cost to include chloroquine distribution in antenatal consultations in Kedougou?).
* Finally, in order to assign tasks to the health post nurses, the participant writes up a detailed description of the work that is expected of the nurses in the context of the proposed programmes. Combined with regular supervision by the doctor, these instructions provide an alternative to costly and ineffective training seminars.
* At the end of each module, the official in charge of the particular national programme that is being studied (e.g., tuberculosis, nutrition) is invited to Thiès to present the main points of the national policy, and to compare them with the teaching received in Thiès.

The Programme

The content of the various modules is defined by the primary health care policy which should provide curative, preventive or promotional solutions to the majority of health problems encountered by the population. The health post is the most peripheral health facility where a professional health agent can be found, and as such plays a key role in this policy as the link between the health services and the community. For this reason, the operation of these health posts is at the core of the instruction we offer.

The prime objective of the health posts is to provide health services that are also oriented towards encouraging community participation. These services (Equipe du projet de Thiès) are analysed and taught by modules 2-8 (respectively, curative care, care for the chronically ill, antenatal care, well-baby clinics, nutrition, family planning, and, finally, community participation, which is the underlying paradigm of the entire course). Module 9 deals with the extension of health post activities to reach people in outlying villages using community health workers and mobile maternal and child health clinics, while module 10 deals with the transformation of the (second level) health centre into a true referral facility, through the improvement of both its technical performance and efficiency.

At this stage of instruction, the participants begin to feel discouraged. How can we even consider proposing the integration of preventive and promotional activities, when even curative care is not properly carried out at the health post? The subsequent modules are designed to answer this question. These management modules deal with how to make better use of available resources, that is to say, the training and management of personnel (module 11); finances and cost accounting (module 12); drug management (module 13); information systems (module 14); and administration (module 15).

The very first module is different from the others in that it provides participants with the basic theoretical elements to allow them to judge the quality of a health service and the care offered, and it establishes a common vocabulary for staff and participants to use. The

ABC's of statistics and epidemiology are also presented in this module, because they are useful in the process of data collection.

Module 16 serves as a transition from the initial three-month training period to the subsequent period of supervision of the doctor in the field. Having received all the theory related to the creation of an integrated health system, doctors then develop a plan for the coverage of their district, and an action plan. The coverage plan describes the location of future health facilities and the segments of the population that will be covered by them. The action plan is a declaration of intent which specifies the ways in which health development will be carried out in the district.

Finally, modules 17 and 18 describe, respectively, how the planning process is carried out on the national and regional levels.

An example of a module: Curative treatment at the health post level.
Let us start off with some hypotheses:

* Doctors have not been trained to optimise resources but rather to maximise the effectiveness of treatment;
* nurses have not been trained to diagnose and to treat, but nevertheless have the responsibilities of a general practitioner;
* both doctors and nurses devote less effort to solving patients' problems than to applying ready-made curative formulae.

If these hypotheses proved true, what would one find in the health facilities?

* that less costly, alternative treatments are neglected;
* that the tests requested contribute little to the final decisions;
* that treatment is not continuous (e.g., patients stop taking their antibiotics before completing the full course of treatment, prescriptions are not collected);
* that there is a lack of effectiveness (e.g., diseases with high morbidity or mortality for which treatment exists, and that are not spontaneously cured, are poorly treated).

These are the types of data that the observation outlines given to participants attempt to identify.

What do participants actually see when they observe the treatment of patients, or consult medical registers? As far as the diagnoses are concerned, they see:

* that the dominant symptoms lead to a variety of questions which are not always rational;
* that stethoscopes are used in unthinking, ritual fashion;
* that the research for physical signs is relatively rare (sometimes because there is not enough time for the examination);
* that treatment:

a) is expensive (the systematic use of quinimax or paluject for malaria, the overuse of injections); b) is useless (vitamins, camphosulphonate of soda); c) always involves medication (whereas many patients would benefit from a more psychotherapeutic approach); and d) that the choice of medicines, the dosage and the period of treatment advised are often fanciful.

And what do they observe in the area of health service organisation?
* Without an enclosed space, no therapeutic dialogue between patient and doctor is possible in many health posts; only a sheet separates the nurse and his/her client from the lines of waiting patients;
* furthermore, the characteristics of the patients seen by the doctors are identical to those of patients seen by the nurses (i.e., like the nurses, the doctor is involved in primary consultations). This is a case of both flagrant under-utilisation of the doctor's skills and of ineffectiveness, since patients who could truly benefit from seeing the doctor do not necessarily receive this service;
* patients who have been identified and diagnosed as malnourished receive only advice - while a milk distribution programme is simultaneously organised in the same health post. This shows that integration remains a futile word.

After agreement is reached on what participants have discovered through their observations, the following theoretical elements are taught: the rudiments of systematic decision analysis; the characteristics of critical symptoms; decision trees and clinical algorithms; formulating empirical strategies; choosing predominant symptoms and standardised treatments; systematising case referrals to the doctor; an annotated drug list; organizing the flow of patients; evaluating strategies; dealing with the psychosomatic aspects of treatment and the different aspects of empathy and negotiation with the patient; and essential information. In one exercise participants prepare instructions for their nurses which are, themselves, decisions trees for diagnosis and treatment (e.g., for leucorrhoea, children's cough, and the frequently referred to "ache all over" feeling (called "toy" in Wolof).

Discussion

In an evaluation carried out by the Ministry of Health of ten doctors who participated in the Thiès course, the relevance of the approach used, the quality of instruction, and the usefulness of the course for the regional or district medical officer's job were all rated between "good" and "excellent". However, an assessment of the course's relevance to the organisation of health services cannot be based simply on a participant satisfaction survey. The extent of changes introduced in the operation of the health services has to be examined as well. These changes were the subject of another evaluation (Ministère de la santé publique du Sénégal, 1987), the results of which, though promising, are too premature for us to draw final conclusions. Since we cannot yet analyse project outputs, let us therefore examine the unique aspects of this course.

Target Population

The course is devised for district medical officers. They were chosen over other categories of health personnel because of the importance of the medical district in the planning and management of the health pyramid (OMS Bureau régional pour l'Afrique, 1985). Nevertheless, central to the course is the goal of improving the performance of health post nurses on whose shoulders lies the main responsibility for the actual implementation of primary health care. In this sense, the main concern of the Thiès course is to train health team leaders.

Health policy options (L'équipe du projet Kasongo, 1981)

If people do not actually use the health services, both the advice given and the promotional health initiatives taken by the personnel of these services cannot possibly be listened to by the community members. It is for this reason that the accent of the Thiès course is on the rehabilitation of the health services. The policies for achieving this goal include the development of an integrated health system; the delivery of on-going general treatment through primary health care; the participation that is needed from the people in order to define with them the ways of promoting health service development and, at a later stage, their participation as a means of achieving social dynamism (WHO, 1978).

Management Policies

The management techniques that are employed vary according to the health problems to which they are applied. Total commitment to the rules of any one school of management thought is not appropriate. Let us consider a few examples. In the case of access to curative treatment, the approach of the public health service is similar to that of a commercial sales area, where the objective is to extend market coverage by creating "selling outlets". On the other hand, the attempt to render curative examinations effective requires thinking similar to that needed to organise a production unit. A systematic approach is used to define the interaction and tasks of the various health facilities. A Taylorian approach (Taylor, 1954) is applied to the issues of delegation of authority, and the definition of technical and administrative lines of authority.

The Roles of the Teaching Staff

The Thiès project has four main functions: in addition to the actual training of district medical officers, these include the supervision of the Thiès-trained doctors in the field, operational research, and planning assistance on the Ministry level. These functions are mutually supportive. Supervision, for example, gives trainers first-hand knowledge of field realities which can make their courses more relevant, allow them to make more realistic planning recommendations, and hopefully results in a clearer definition of research targets. It is, therefore, preferable that one team is directly responsible for all activities, and that excellent communications would be maintained with all sections of the Ministry.

Teaching Methods

The information used as subject matter for the course is drawn from the participants' own experience, which is brought out during discussions and seminars. But the project has also taken advantage of the proximity of health services to identify their dysfunctional aspects, to learn to observe and, as a result, to supervise. It is a challenge for public health instructors who are not fortunate enough to have their own "testing ground", to teach students not to interfere in an activity but to identify errors, to understand the logic of these errors, and to select key problems whose solutions may help to move the overall organisation of services closer to the development of an integrated health system.

Training lasts for only three months, because it would be difficult to remove 10 of the country's 40 district medical officers from their posts for a longer period without seriously hampering the operations of the health services. This constraint requires that the programme is condensed and this is achieved by not teaching the fundamental sciences systematically.

An objection to this methodology then comes to mind: is there not a danger that this type of instruction will train managers who tend to be inflexible? It is the responsibility of the supervisors to guard against this possibility by providing more opportunities for operational research within the scope of the management practices of the doctor. These supervisors, therefore, have to have a Master's in Public Health. Investment in such training for the district medical officers themselves would not be cost-effective given their approximately 60% attrition rate and their average 3-4 year term of service. What also distinguishes the Thiès course from a Master's programme is the relative absence of international health literature and non-Senegalese case studies, which have been eliminated in order to render the course more directly beneficial and to avoid creating a need for access to international literature that will be difficult to satisfy in the future.

Should the teaching role of the project be perpetuated?

Teaching young medical students how to organise health services is not an easy task, in that the training has to respond to questions they have not yet had the chance to ask, given their lack of experience in the field. Nevertheless, it would be logical for the university to assume responsibility for this instruction, even if it were to be programmed as in-service training.

Under what conditions should this be done? Some members of the teaching staff would need to have the field experience of a district medical officer rather than just simply clinical or academic experience, or experience in the administration of vertical programmes. Instructors would have to continue living the realities of the medical services, albeit on a part time basis. It would not be sufficient for them merely to have responsibility for a pilot health zone, the logic of which can be so different from the normal health service situation, both in terms of available resources and concerns. We have already mentioned how useful it is to have the four roles of instruction, supervision, research, and assistance, in the planning carried out by one, multi-faceted team. The university could serve as an appropriate context for such a team, but only if the presence of the appropriate skills could allow the university to alter its isolated position. Without such skills at the university level, it would be better to maintain the Ministry of Public Health as the institutional base of the team. The department of public health would then have to develop a long term policy to house the team of "public health generalists", by hiring qualified associates and by modifying its instructional and research objectives. More specifically, this would require that the public health department should bring about changes in clinical care and the training that is offered in this area at the university to make it more practical. To do this would require:

* the creation of lines of communication between other departments of the medical school and the peripheral health facilities in order that both can identify subjects for useful research;
* the introduction of statistical, epidemiological and decision-making tools currently lacking in the departments of the medical school;
* the instruction of medical students in the operational concepts of public health that are useful to generalists, as well as the premises of the organisation of the health services.

The possibility of offering a Master's degree would be useful for future, high level officials. This would make sense only if the conditions mentioned above, particularly those concerning qualifications, were met, and if career opportunities existed. Certain of the above reforms are well under way in the developed countries. They are based on the condition that the universities must leave their ivory towers and that the public services should introduce research into their operations. Delays in the adoption of these reforms would be all the more harmful to developing countries where it is more important than elsewhere in the world that resources are managed to produce maximum benefit.

Note

The field work was done in Thiès by Drs. P. Daveloose, A. Bâ, N.N. Toure Sene and J.-P. Unger, under the supervision of Professors P. Mercenier and H. Van Balen, directors of the Public Health Research and Training Unit of the Institute of Tropical Medicine, Antwerp, Belgium. This paper has been prepared by J.P. Unger.

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EVALUATION

Evaluating Innovative Medical Education Programmes: Common Questions and Problems

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Abstract

Programme evaluation of six longstanding innovations in community-oriented, problem-based medical education was studied at McMaster University, Ben Gurion University, The University of Limburg at Maastricht, Newcastle University, Michigan State University and the University of New Mexico. Three key aspects of the evaluation of these programmes are addressed. First, key questions most frequently asked by programme directors and evaluators are described, and selected examples from the six schools are provided. Second, twelve factors which limit programme evaluations are presented and briefly discussed. Third, some of the political issues inherent in programme evaluation are described. Recommendations and guidelines are offered to programme leaders and evaluators who are actively involved in, or contemplating curricular change at health institutions.

Introduction

In North America, private foundations, such as the W.K. Kellogg, Pew Charitable Trusts, Rockefeller, and Robert Wood Johnson, are attempting to move medical education toward population and community perspectives (Bruce, 1989; Schroeder, 1990; Rimel, 1989). The need for similar efforts is recognised in Africa, Asia, Europe and Latin America. If "Health for All by the Year 2000" is to be more than a slogan, each institution concerned with the education of future health professionals must act to increase the emphasis of its programmes on relevance to the community and to strengthen the partnership between communities and responsible institutions.

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The World Health Organization, the Network of Community-Oriented Educational Institutions for Health Sciences and the World Federation for Medical Education are actively promoting community-based and problem-based learning as contemporary educational methods consistent with these goals (Goon, 1989). Most of the world's more recently developed medical schools, and a great majority of the current innovations in medical education feature community-oriented (World Health Organization, 1987; Richards et al., 1987) and/or problem-based learning (Barrows, 1980). While the vast majority of the world's institutions that train future health practitioners continue to use traditional educational approaches, there is a growing interest in the methods and outcomes of innovative programmes.

A handful of these innovative programmes are more than a decade old and have matured sufficiently to permit some analysis of the processes of their programme evaluation. Informal surveys and interviews were conducted with programme evaluators from McMaster University in Canada, Ben Gurion University in Israel, the University of Limburg at Maastricht in The Netherlands, Newcastle University in Australia, Michigan State University and the University of New Mexico in the United States. Questions addressed the structure, context and support of programme evaluation; types of data collected and data management; impact of evaluation on the programme; the admissions process; and limitations and constraints faced by evaluators.

Each of these institutions had expressed its educational philosophy in the use of community-oriented and/or problem-based learning methods (World Health Organization, 1987; Richards et al., 1987; Barrows et al., 1980). More importantly, they had accepted the challenge of documenting and demonstrating the merits of their medical education programme. It is important to note that traditional measures alone may not assure that the innovative features of these programmes are assessed adequately. The evaluation questions and methods developed to assess traditional curricula are important, but may not suit community-oriented and problem-based curricula because they are unlikely to capture all the goals of these new programmes.

The characteristics that were sought by evaluation studies of recent innovative medical curricula have been described (Friedman et al., 1990)*. These studies investigated hypotheses of difference in psychosocial and interpersonal skills, continued or life-long learning, professional satisfaction, the behaviour of practitioners, educational achievement and cognitive development, and the nature of the graduates' continuing relationship with their parent institution (Friedman et al., 1990). It was also predicted that no differences would be found in the passing rates on licensure and certification examinations, likelihood

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of making major clinical errors, clinical problem solving related to common medical problems, and cost efficiency of practitioners (Friedman et al., 1990). Furthermore, it was predicted that the educational costs of operating the programmes would not be significantly different (Friedman et al., 1990).

The present manuscript is intended for programme directors and evaluators at institutions that are actively involved in, or contemplating change in their curriculum. The authors address three key questions about the evaluation of community-oriented and problem-based curricula: 1) What questions are most frequently studied by programme evaluators? 2) What are the factors which limit evaluations? and 3) How can programme leaders and evaluators address issues concerning the politics of programme evaluation?

Key Questions Commonly Aked

The three types of most commonly asked questions are related to differences, abilities, and impact.

1. In which ways are students in the new programme different from those in other or previous programmes? Are they safe with patients? Have the students been harmed by the programme, i.e. will they be able to compete successfully for postgraduate positions and future employment? Have the academic staff fulfilled their responsibility to the students and to the institution?

Studies comparing students from innovative medical school curricula (problem-based and/or community-oriented) with those from more traditional programmes have reported differences in clinical problem solving abilities (Patel et al., 1991). Major differences in clinical skills and clinical performance have not been found (Schmidt et al., 1987; Kaufman et al., 1989). Students from problem-based tracks tend to perform as well or somewhat lower on traditional measures of medical knowledge than their peers in conventional curricula (Schmidt et al., 1987; Kaufman et al., 1989; Goodman et al., 1991; Hamdy et al., 1991; Neufeld et al., 1989). There is some evidence that student attitudes and levels of stress are affected by innovative programmes (Moore-West et al., 1989). Finally, students from innovative programmes perform as well or better during residency (postgraduate) training (Woodward et al., 1981; Woodward et al., 1983; Santos-Gomez et al., 1990).

2. What has been the impact of the innovation on the parent institution, on other health education institutions, and on defined populations? The impact of a new programme on the parent institution or another institution can be assessed by documenting the spread of educational philosophy and methods to other related health education programmes. This has occurred at McMaster, Maastricht, Newcastle, and New Mexico. However, the literature contains little evidence of systematic study to document the spread of educational philosophy and methods from one institution to another. The acquisition or loss of external funding for the extension and continuation of innovative programmes (Sheline et al., 1990) and increased publicity for the parent institution derived from the new programme provide

additional examples of impact.
For McMaster, Maastricht, and Beer Sheva, the major extension of their programmes has occurred largely at institutions in other countries. With the exception of Calgary and Sherbrooke, other medical schools in Canada were slow to adopt changes but have recently begun to entertain major curricular revisions. The same is true for traditional medical schools in The Netherlands and Israel. The University of New Mexico and McMaster University have influenced other medical schools in the United States to start new programmes in medical education. In addition the lessons learned in New Mexico about the strategy of parallel tracks as a vehicle for change from within established medical schools have been adopted worldwide (Kantrowitz et al., 1987).

The impact of the programme on a defined population is much more difficult to study (Tarlov et al., 1989). Although doctors play an important role in the health of a population, the extent to which the well-being of a defined population can be attributed to a programme is a complex issue involving many other health care providers, as well as social, environmental and political issues. The length of time and the resources required to address this question are usually beyond the reach of most evaluation programmes (Naggon, 1987; Gordischer, 1987).

3. How long can the abilities, skills and attitudes acquired during medical education be expected to be evident? In North American medical schools, postgraduate training can last as long as undergraduate training. Because of its length and the intense socialisation process which occurs, postgraduate training has the potential to erase or cancel out intended effects of undergraduate training. Behaviours and abilities can be acquired after undergraduate matriculation and contribute confounding variables to the evaluation data, thus complicating its analysis (Kassenbaum, 1990). The rapidly changing environment in which health care is practised means that the workplace and practice environment encountered by new graduates may not be supportive of innovative approaches which were part of their training. It can be difficult to ascertain the degree to which educational interventions are related to behaviours in practice (Mawardi, 1979). While most institutions are required to gather data about their graduates, attempts to link these data to outcomes of innovative programmes can help programme leaders and evaluators to justify the resources that are necessary to carry out their evaluation.

Limitations of Programme Evaluation

Can the programme be evaluated (Rutman, 1984)? A realistic understanding of the potential and actual limitations of evaluations is essential, if programme leaders and evaluators hope to assess with accuracy the impact of educational interventions on the professional decisions of students and graduates. Several important limiting factors have been described.

1. Essential factors related to **the admissions process** which influence programme outcomes

are: random selection of students (Cano Valle et al., 1987; Li Xue-min et al., 1987; Lipkin, 1989); the degree of reliance on academic qualifications (Maddison, 1990; Antonovsky, 1976); the extent to which students are selected for their understanding of, and ability to fit within the programme (Maddison, 1990; Antonovsky, 1976; Martinez-Burrola et al., 1985; Brazeau et al., 1985; Ferrier et al., 1978); the age of students upon entry into professional training, and the degree to which local communities participate in the selection of students (Siega-Sur et al., 1987); and national, state and provincial limits specifying eligibility for admission to the institution.

2. **The availability of postgraduate positions** can influence the career choice and geographic location of graduates from innovative programmes. The larger number of physicians competing for relatively few postgraduate training opportunities in Europe (Deliege, 1987) and the limited positions available in tertiary care centres in Israel (Ellencweiz, 1983) are two examples.

3. **The availability of expertise in evaluation** may be limited. Consultation may be available through WHO. Collaborating Centres and organisations such as the Network of Community-Oriented Institutions for Health Sciences, and the World Federation of Medical Education.

4. The **technical capability** to collect and analyse evaluation data or to follow individuals longitudinally may be limited. It is not always possible to obtain, store and retrieve routine data. Longitudinal studies amass ever increasing data. Some simple, low cost methods for more limited evaluations have been described (Mennin et al., 1987).

5. **Financial limitations** on programme evaluation are often severe. It is exceptional to find educational institutions, such as Maastricht and New Mexico, with personnel and resources dedicated to ongoing and longitudinal programme evaluation.

6. The availability of **secondary data sources**, such as those used so effectively by Woodward and associates (Woodward et al., 1990), may be limited elsewhere.** Secondary data are derived from the trail of records and documents, such as billing patterns, which health providers produce as part of their routine activities, or from routine information collected by professional or licensing bodies. Two advantages of secondary data are that they are more objective than self-report through surveys or interviews and can provide substantial information at a comparatively low cost. In the United States, however, there are hundreds of different health insurers. This makes large scale studies, which require the availability of secondary data, more difficult to conduct. There exist some significant data bases in the United States (Erdmann et al., 1986; Jonas et al., 1991), but they have not been used to compare graduates of innovative and traditional programmes. Medical schools located in countries with centralised health systems and data collection can best use the potential information stored in these data bases. Poor record keeping or lack of centralised records makes acquisition of secondary data difficult.

7. The availability of **national examinations** for licensure provides some comparative data. However, these examinations may not test for or provide resolution of differences

** See paper by Woodward in this Volume of the Annals.

introduced by innovative programmes.

8. Few programmes appear to have **specific mission statements or sets of goals** that lend themselves to evaluation. More common are vague statements about producing undifferentiated graduates capable of meeting the diverse needs of society. The more specific the articulated goals, the easier the programme is to assess.

9. **Geography** can be a significant barrier to the assessment of programme outcomes. Large distances, poor communication, unreliable postal system, difficult roads, and lack of availability of spare parts for transport are obstacles to obtaining data about students, preceptors and graduates as professionals.

10. Variability of **institutional commitment** to ongoing programme evaluation can disrupt the ability to conduct longitudinal studies.

11. **Unanticipated changes** in leadership (institutional or programme) or financial support can dramatically affect programme evaluation.

12. The more **complex** the **programme**, the more difficult it is to evaluate. Complexity requires lengthier and, therefore, more costly evaluations and makes interpretation of results difficult.

The Politics of Programme Evaluation

The evaluation of new or innovative education programmes has political as well as educational implications (Chelimsky, 1987). Change, desirable or not, threatens the *status quo*. Differences of opinion will always exist about the merits of the philosophy of a programme and its implementation. The process of innovation and change in an education programme will stimulate both advocates and detractors. Information about the ongoing implementation, process and outcomes of the new programme will be used by different interest groups as sources of power to support or refute their point of view. The bearer of bad news may not be appreciated or listened to.

Who then are the consumers, the stakeholders, of programme evaluation? They are students, academics, other staff, administrators, community people, government, funding agencies and, most important, the public. Each group has its specific information needs. Students need to be reassured that their programme will not harm them, that they will be able to complete it, and be able to compete successfully for postgraduate positions and professional advancement.

Academics and other staff require information to assure them that they are providing students with training experiences that are appropriate to licensure and adequate to enable students to deal with health problems which they will encounter during and after their training. They also share concerns about student performance on any national examinations, as this would reflect on the status of their institution. Programme planners and developers require feedback on the closeness of fit between the intended and actual programme. Frequent "in-flight" corrections in educational programmes need to be based on observations, outcomes, and information that are systematically collected and analysed by programme evaluators. Funding agencies require reports to assure them that resources are being used to meet the goals and original intents for which the funds were granted. Government agencies (state, federal, etc.) require information that the programmes plan for, and meet public needs and specified goals. The public will want a responsive health system that provides access to practitioners who meet their needs.

Programme evaluation can be used to enhance or diminish credibility. Proponents hope to prove and opponents hope to disprove beliefs about new educational programmes. A clear and concisely written description of the programme is essential to dispel misunderstandings and incorrect information obtained through rumors and third party discussions. Descriptive reports early in the life of the new programme will help to assure accurate communication. Important questions which can arise as a result of early descriptive reports are: How well do students perform on traditional measures? What new measures need to be developed to enable innovative aspects of the programme to be assessed? What attitudinal differences of students, academics, preceptors and employers have been measured and can be attributed to the programme? What relationships have been established, enlarged, reduced or eliminated as a result of the programme? How has the programme changed over time?

In summary, the following recommendations and guidelines have particular relevance to programme leaders and evaluators at health institutions that are actively involved in, or contemplating change of their curriculum.

a) Whenever possible ask questions that are similar to those posed by evaluators at institutions that have undergone comparable changes. These questions are useful in comparing results with other programmes and institutions. What are the differences between students in the new programme and an appropriate comparison group? Have the students been adversely affected by the new programme? Are they safe with patients? What has been the impact of the programme on the parent institution, on other institutions, on the public? How long can the abilities, skills, and attitudes acquired in the health education programme be expected to be evident? b) Limitations imposed by financial, technical and geographic factors are important to recognise and to consider in a feasible evaluation plan. The admissions process and availability of postgraduate positions affect the design and outcome of the evaluation. c) Use secondary data sources whenever possible. d) Collect comparative data on performance in national and licensure examinations. Accept the possibility that these examinations may not demonstrate or emphasize innovative aspects of the new programme. e) Simple studies are faster, cheaper and easier to interpret and report. They can provide critical information in the initial stages of programme change. f) Programmes with vague mission statements and goals are much more difficult to evaluate. g) Programme evaluation provides data which can be used to support or oppose specific points of view with respect to the internal politics of an institution. Evaluators must identify and deal with the needs of each group of stakeholders. h) Time is a critical factor in evaluation. Plan evaluations with both short and long-term goals in mind. i) Study what others have done and the context in which it was done. Coordinate replication studies with other institutions to maximise what can be learned.

The collective experience of six community-oriented, problem-based innovations at McMaster University in Canada, at Ben Gurion University in Israel, at the University of Limburg in The Netherlands, at Newcastle University in Australia, at Michigan State University and the University of New Mexico in the United States can contribute to the development of a theory in practice for programme evaluation in medical education. Continued analysis of the evaluation process will be of value to programmes now and in the future.

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Evaluation to Improve Educational Programmes

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Abstract

This paper is concerned with evaluation of courses and evaluation of the outcome of courses as a method for deciding how such courses may be improved. The paper identifies the need for asking relevant questions, questions that are relevant for those who are concerned with the improvements - the stakeholders. How such questions lead to the selection of appropriate methods for data collection, how the information can be analysed and how the results should be communicated to the stakeholders concludes the paper.

Purpose and Scope of Programme Evaluation

As health sciences educators we make many decisions. We determine what our students need to learn, select methods and resources conducive to their learning, and set the basis on which they will be certified. To make such choices we need information. We need to know where our students will be employed, what they will be expected to do, how effective our programmes have been in providing the necessary skills, and what modifications we should make in the sequence and/or emphasis we give to the learning of particular skills. Everything else being equal, the choices we make on the basis of sound information lead to better results than choices made without information (Rotem et al., 1983).

Programme evaluation is concerned with the systematic gathering and interpretation of information about a programme. The information is used to make informed decisions about the development and management of a programme. **It is here a distinct activity aimed to improve rather than to prove.** It emphasizes the need to anticipate and solve problems that are important, rather than problems that are merely easy to measure precisely.

What should be Evaluated?

Given the many decisions that need to be made in planning and conducting educational programmes, evaluation should be seen as an integral part of our educational activities. Evaluative information is likely to be useful if it is timely and relevant to particular concerns. Information which is supplied too late or which is not relevant is unlikely to be useful for planning and managing programmes. Thus, evaluation should aim to supply the best information that can be obtained at the time when decisions are to be made.

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The Planning Stage

When we plan a new educational programme or when we review an existing programme, we need to be clear about the purpose of the programme. We need to understand, for example, who will be trained, where they will be employed, what they will be expected to do and therefore, what they need to learn.

Beyond the general analysis of education and training requirements, information is needed for the detailed planning of the curriculum and all the arrangements for learning. The formulation of objectives, for example, should be based on information from practitioners, as well as subject matter specialists. The selection and design of learning materials, teaching and assessment methods, and organisational setting for learning, require careful analysis of what is appropriate and practical. The plan should also be justified from a conceptual point of view.

The use of information in the planning process will improve the chance that our programme is effective in meeting the needs of our students, acceptable to the funding and/or accrediting authorities, and efficient in the use of scarce resources.

The Conduct of the Programme

During the implementation of the programme, information is needed about the appropriateness of the plan. It is necessary to verify that assumptions about how it will work are correct. For example, was it realisitic to expect that the objectives will be achieved?, was the sequence appropriate?, were the students getting sufficient opportunities to practise skills and to apply knowledge?, were the required books available in the library?, were the students making reasonable progress in their study?, did they seem to enjoy their learning experiences?

It is also important during the implementation process to be sensitive to outcomes which are not expected or intended. Unintended outcomes, often referred to as the "hidden curriculum", may be positive but they may also be undesirable by-products which should be avoided. For example, in the course of learning in the clinical setting, students may adopt negative views about other health professions. Also, rather than learn how to learn, students might learn how to overcome assessment hurdles with superficial knowledge and lack of deep understanding. As these are unintended consequences, they can only be identified through sensitive review of the **actual process** of the programme.

Outcomes

In the final stage, evaluation questions need to be asked about the 'products' at the end of the programme. Important decisions need to be made about progression of students or certification of their competence. At this stage it is also necessary to check again the assumptions about the appropriateness of what has been learnt in relation to the requirements of the field in which graduates will be employed. In this way, the cycle will be completed;

it commenced with questions about the learning needs of the potential students and finishes with verification that they have actually obtained the competences they require.

The significant attribute of this approach, as articulated by Stufflebeam and his colleagues (1980), is the opportunity to improve the educational programme throughout the process. If the outcomes are not satisfactory it may be necessary to reassess the needs to be addressed by the programme or its feasibility, it may be necessary to modify the plan (the curriculum and other arrangements) and/or the way it is implemented. For example, we may determine that there is a need for additional training for teachers or for change in administrative arrangements.

This interactive approach enables us to effect improvements during the process - we do not need to wait for failure before we fine-tune our plan or its implementation.

As some results can only be appreciated after an interval of time, it is necessary to look at outcomes at different time frames to determine whether what has been learnt is actually applied in practice and whether it has a positive impact on the delivery of service.

Steps in Design of Evaluation

Step 1 - Description of the Programme

The first step involves clear identification and description of the programme we wish to evaluate. The description should include details about the major objectives of the programme, the target participants, learning activities and organisational settings.

Step 2 - Identification of the Stakeholders

The stakeholders are people or institutions who want to know about the programme and whose need for evaluative information we wish to address, for example, a funding agency, health authority, community, programme staff, students.

It is increasingly accepted that evaluation occurs in a pluralistic and political context, where different perspectives and aspirations are legitimate and where the potential for winning or losing is evident. The existence of many stakeholders with different concerns, claims and interests is accepted as an object of the evaluation process rather than as an impediment. The clarification and resolution of their values and requirements is integral to the planning and conduct of the programme.

Step 3 - Clarifying Areas of Concern

Each stakeholder may have different and even conflicting concerns. The trainers for example, may want to know whether the students are indeed qualified to practice. The students, administrators and the community, on the other hand, may be concerned, respectively, about the quality of supervision in clinical settings, the use of scarce resources, and the attitudes of the health workers towards service in remote areas.

It may be necessary to be selective and to draw clear boundaries and priorities in consultation with the audiences for whom the evaluation is intended. The issue of timing and the potential of the evaluation to support programme development may help to make these difficult choices.

Concerns expressed by one or the other stakeholders may not necessarily be identified as problems. Concerns may reflect important values that are implicit in the programme which the stakeholders want to cultivate, and/or such concerns may be critical aspects of the programme which need to be monitored regularly.

Step 4 - Formulating Questions

The formulation of specific questions in relation to each concern or problem is one of the most difficult steps in evaluation. Questions need to be broad enough to be meaningful, yet specific enough to avoid confusion and different interpretation by different people.

One of the common pitfalls of evaluation is a tendency to choose questions which are easy to answer rather than questions which are important, we should not allow the method to dictate the question.

Step 5 - Formulating Indicators and Criteria

The next step is to determine what specific evidence - qualitative or quantitative - we wish to obtain in order to address the evaluation questions. The evidence could be expressed in terms of indicators and criteria. Indicators are variables which reflect the phenomenon that is to be evaluated. For example, scores obtained in an examination reflect a certain type of learning, extent of participation in community activities reflects interest in community life. A criterion is a standard against which judgement may be made. For example, the pass rate for an examination may be set at 60%, a satisfactory rate of participation may be expressed in terms of 80% of the students attending at least four community meetings per month.

An ideal **indicator** should be:

. valid	actually reflect what it is intended to reflect;
. reliable	lend itself to measurement or description with minimum error;
. objective	less affected by personal bias;
. sensitive	changes in the indicator must reflect changes in the situation or phenomenon;
. specific	sensitive to the given situation or phenomenon only.

Step 8 - Selecting Methods for Obtaining Information

Given the specific questions and the type of evidence we need to obtain, it is time to determine how we can gather the information and from what sources.

The methods of obtaining information may be either quantitative or qualitative. In the past, evaluators were often limited in the choice of methods by the expectation that they should provide positive proof of cause and effect. Unfortunately, hard won knowledge from experienced practitioners is often not well documented and not used because it is regarded as subjective and not "scientific".

The design of evaluation should accommodate the complex interaction between variables which cannot be readily isolated, controlled, and/or replicated in different situations. Qualitative approaches enable detailed description and in-depth understanding of phenomena in natural settings (Patton, 1990). In contrasts to reductionist approaches which assume that there is an absolute truth, constructivist methods acknowledge subjectivity and help to highlight the different perspectives on the same issue. How different people see something quite differently may be very instructive but difficult to measure precisely.

Step 9 - Processing the Information

The type of analysis and summary procedure which is used should be appropriate to the evaluation question(s) to be studied. Potential weaknesses in the collection of data or in the analysis should be mentioned. The categories used for collation should be meaningful, internally consistent, and free of logical gaps. Two pitfalls to be avoided in this step of the evaluation process are:

- allowing data collection and analysis to reduce questions to a false implicity. Assuming that statistical significance is the same as practical significance, for example, finding that only 5% of the students in a training programme complained of a particular deficiency does not necessarily mean that the complaint should be ignored.
- using complicated statistics to impress the reader. Some evaluations do not require any statistical analysis (Rotem et al., 1983).

Conclusions in the report of the evaluation should form the basis for modifying the programme. The report should be tailored and addressed to bodies or individuals requesting the evaluation. Decision-makers should be cautioned about interpreting equivocal findings. All conclusions should be defensible (based on logic and appropriate information) and defended (reported with possible alternative explanations, and/or reasons for rejecting a conclusion).

Step 10 - Implementing Evaluation

If the findings of evaluation are to be accepted and used they must be seen to be relevant and credible by the potential users. To this end it is necessary to consult the users about the scope and method of evaluation. In the absence of such involvement the users might not be committed to the evaluation and hence might be less inclined to incorporate the findings into their decision-making.

The implementation of evaluation requires careful planning and attention to detail. It is necessary to determine who will do what, when and how. The resources need to be clearly identified. The permission or support of the appropriate authorities should be secured. Consideration should be given to opportunities and constraints in implementation, and arrangements should be made for contingencies for dealing with potential difficulties. A time table should be prepared.

For an external evaluation it is desirable to draw up an explicit contract with the evaluator. The terms of reference should specify the expected role of the evaluator, the framework for consultation, the timing for each step, and the expected outcome of the evaluation.

A truly, responsive evaluation is similar to the work of the detective attempting to unveil a mystery. New leads become apparent in the course of the investigation that raise new questions and require changes in the methods of investigation (Smith et al., 1990). Thus, far from being static, evaluation is dynamic, cyclical, and a never ending process (Shadish et al., 1991).

Conclusion

This paper promotes the use of programme evaluation as a tool by planners and managers of programmes. The mystification of the evaluation process as a highly technical operation should not discourage us from its application. Preoccupation with scientific purity and technical elegance should not direct evaluation to problems that are easy to measure, rather than problems which are important to solve. Evaluation and research have frequently been applied to trivial questions and have produced data under conditions that are not necessarily representative and often too late to incorporate in decision-making.

The advantages of using the decision-making model for educational evaluation include:
- provision of a systematic approach to evaluation;
- provision of appropriate information to diverse groups at the time they need it;
- wider and increased use of information for decision-making;
- empowerment of stakeholders to participate in all stages of the evaluation; and
- awareness of the developmental nature of educational evaluation (Weiss, 1983).

The approach suggested in this paper should have particular appeal to those who are concerned with the use of the findings. The high level of participation of the stakeholders in forming the questions for the evaluation and in determining what evidence will be admissible for decision-making and the methods for obtaining it, can be expected to contribute towards a higher level of ownership of the findings and thus commitment for action. This is a learning process which underpins any improvement in programme development and management.

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A Model of Evaluation for Change: Health Professional Curricula in the Context of Health Care and Education*

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Abstract

It is argued that curriculum evaluation should not be based solely on given goals or programme objectives as this would be unlikely to engender any really significant change and even then only within a prescribed framework. Dynamic evaluation for change must be able to consider significant issues and contingencies that are part of the changing health care environment.

The dynamic model in the present paper incorporates un appraisal of the external, as well as internal context of health care practice. The external context is explored for changes in social, economic and professional expectations, changing technologies, international relations and salary structures. The internal context is reviewed with respect to the changing abilities of students, needs of academic staff and the changing roles of institutions of higher education.

The purpose of this paper is to present a model for evaluation of health professional curricula which is sensitive to changing health care needs, policies and systems and to the characteristics of educational institutions, providers and students.

It is argued that movement towards the goal of Health for All is dependent on a change in the knowledge and skills of health practitioners, and that this will only be achieved if curriculum evaluation is based on an ecological perspective of health, an holistic view of human beings and a dynamic, interactional orientation to the process of education.

Accordingly, the first part of the paper explores the evolving holistic or ecological approach to health in Australia, and the contradictions between the rhetoric and the current reality. Further, it argues that the desired change in health professional practice would be assisted by the adoption of an appropriate framework for evaluating and

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changing health professional curricula, which recognizes changing assumptions about health and health care and which, therefore, would lead to better preparation of health professionals, regarding their capacity to initiate and support change.
The second part of the paper provides a brief overview of approaches to curriculum evaluation and their deficits. Arguments for a new framework for curriculum evaluation are advanced.
The third and final part presents a dynamic model for curriculum evaluation, including a detailed illustration of the types of factors (in external and internal contexts) which require consideration.

An Evolving Holistic or Ecological Approach to Health and Implications for the Education of Health Professionals

The dominant concern in society today is quality of life, and how to maintain or enhance it. Across the globe governments, health authorities, researchers and individual people are struggling with the challenge of ecologically sustainable development.

In response to a recent Australian Commonwealth government discussion paper on ecologically sustainable development (1990) and the National Health and Medical Research Council report (1991), endorsing the 1989 European Charter on Environment and Health, asserted *inter alia* that the health of individuals and communities should take clear precedence over considerations of economy and trade; that there is a responsibility to demonstrate that all aspects of socio-economic development (new policies, technologies, etc.) are not harmful in their impact on the environment and health; and that development assistance should promote sustainable development and the safeguarding and improvement of human health as one of its integral components. Commensurately, they recommended that the emphasis in society should be changed from material consumption to quality of life. However, whether the goal of sustainability in health can actually be achieved has yet to be seen.

In Australia, despite the initiation of a comprehensive review of the health sector (Macklin, 1990), it would seem that we are still orientated towards a dependence and illness model of health, rather than towards a focus on self-sufficiency and quality of life. From a global perspective, as Timberlake and Thomas (1990) point out, governments, UNICEF and WHO are planning and delivering health care outside communities, rather than assisting communities to take responsibility. This approach is harmful to sustainable development because it thwarts any attempts by communities to determine their own health needs and ways to meet those needs.

The extent of the problem is reflected in large measure in the theme of the Third World Conference on Health Promotion in Sundsvall, Sweden, "Creating Supportive Environments". As the conference working papers (1991) point out, while the concept of supportive environments is relatively underdeveloped and has been difficult to translate into operational terms, it is imperative that health promotion strategies recognise the role of supportive environments in providing the prerequisites for health development and equity in health.

The degree of the problem is also reflected in a recent issue of the Australian Journal of Public Health , where Nutbeam (1991) argues that, "because the reward system in the health services is largely based on achievement related to measures of throughput and cost containment, rather than to health outcomes, service managers inevitably have a narrow, short-term focus, rather than a public health perspective directed towards optimal community health", and "that there are no tangible rewards for improving community health and no sensible short-term indicators available to measure progress towards this goal". Consequently, "public health in general and health promotion in particular are always in danger of marginalisation".

In summary then, the rhetoric is sound, but its translation into practice is wanting. As Graham and Honari (1991) suggest, the assertions of Boyden (1980) are still applicable today: "Human beings do not all respond alike physically, emotionally and socially, and we must take account of what they feel comfortable with and/or fulfilled by (the intangibles as well as the tangibles) if we are to facilitate health. The insidious and progressive dehumanisation, of which so many people complain in modern society, must now be taken seriously. It is time that we made a deliberate effort to bring the intangibles out into the open, to study them systematically, to improve our language for discussing them and, on the basis of the various approaches which are available to us, to see whether we can reach a degree of consensus, with respect to their relative importance for the quality of life".

What is required is a fundamental shift towards a real, holistic view of people and their health; and health professional educators have a primary responsibility to assist in effecting the necessary changes.

This idea, of course, is not new. The WHO document "Learning together to work together for health" (1988) suggests that "basic education programmes in nursing, medicine, medicosocial work and other health professions should aim at producing generalist practitioners who are able to see each patient or client both as a whole person and as part of society." The Report is critical of "the division, even atomisation of the typical, single-profession health care curriculum, which orientates students towards specialisation and away from general and multi-professional practice", and which "neglects the contribution which other health professions and non-health sectors could make". The report also points to "multi-professional education as a means of remedying these effects"; and that multiprofessional research at the undergraduate level may be used as a learning tool.

Similarly, at the Australian Health Ministers Conference in 1988 (Health Targets and Implementation Committee, 1988), the need to develop a plan for the holistic training of health care practitioners was discussed together with the need to promote education for Primary Health Care and for such education to focus on intersectoral action at the local level. The Conference acknowledged that the health system can only deal with some of the factors which influence health status and that policies and strategies in other sectors including welfare, finance, housing, agriculture, and industry, have important health implications.

Of course, many within the health professions concerned with education echo similar sentiments, but the problem, as indicated by WHO (1988), is that practice encourages a much more blinkered view. We still live in a world (Graham, 1990) where efficiency and cost containment dominate concern for quality of life, where universities reward research rather than teaching excellence, where the non-medical health professions, despite protestations to the contrary, are still seeking to emulate medicine, and where intra- and inter-professional rivalry impede change in curricula.

Nevertheless, we suggest that change is possible if the whole process of curriculum design and evaluation is predicated by a human ecology driven, holistic view of humankind. This emphasizes:

* the health care needs of people who are individuals with respect to their physical, social and spiritual well being, their cultural identities, and their attitudes and values;
* the necessity to view individual health and health care within the context of community, national and global health needs;
* the dynamic relationship between health and all aspects of the environment (including physical, biological, technological, socio-cultural, economic and political);
* the importance of the concept of sustainability in the orientation, development and management of health services;
* the importance for all health care professionals to empower and collaborate with individuals and communities in solving problems of health care.

This, of course, requires a shift of perception similar to that which occurred in physics in the 1920s, when the exploration of atomic and sub-atomic worlds led to a movement away from the mechanistic conceptions of Descartes and Newton to an holistic view (Capra, 1982). It means a coming to grips with the inadequacy of traditional concepts and adjusting our language and our whole way of thinking. It means not merely an intellectual exercise, but dealing with a profound emotional, even existential crisis. Otherwise, health practitioners and health professional educators will perpetrate and probably exacerbate, albeit unwittingly, inequities in health.

To be fair, we must acknowledge that the beginnings of the shift - from mechanistic to holistic conception of reality - are already visible. However, as time is not on our side, we need to do more to translate the rhetoric into practice, lest we face Health for a Few rather than Health for All by the year 2000.

We would argue that many evaluations of curricula are carried out in good faith, but can be laborious, time consuming and insensitive to change. Our focus is on facilitating change by providing an appropriate dynamic framework for reflective evaluation.

A Dynamic Framework for Evaluation

The literature suggests that there is no consensus on what constitutes curriculum evaluation (Westbury, 1970), and that most emphasis has been given to the strategies of the evaluator's task, rather than to theories for interpreting the phenomena of higher education.

The grandiose vision of the contributions that evaluators could make to educational practice is now less emphasized. With the passage of time there has developed a greater acceptance of the shift away from the use of a few psychometric measures to an approach which incorporates a broader range of procedures and techniques. There has been general disillusionment (Cronbach, 1962/63 and Atkin, 1967/68), with the Tylerian (Tyler, 1949) pre-ordinate evaluation model. This prompted Stake (1967) to propose a broadening of evaluation. Since that time others have proposed such schemes as illuminative evaluation (Parlett and Hamilton, 1972), goal-free evaluation (Scriven, 1972) value-free evaluation (House, 1974), holistic evaluation (MacDonald 1971, 1976), responsive evaluation (Stake, 1973, 1975), and evaluation in naturalistic settings (Smolitz, 1975). These represent a significant change in thinking about curriculum evaluation and are in stark contrast to the traditional focus on using measurements of individual pupil personality, behaviour or other attributes to explain the extent to which explicit curriculum objectives have been met or to demonstrate the merits of certain innovations.

In higher education it is still commonly accepted that course evaluations should focus primarily on such procedures as collecting perceptions about the course from colleagues, "educational experts" and students, through open-ended and structured interviews, structured group discussions and questionnaires (Ramsden and Dodds, 1989). The focus is on what has happened in the course and the view is, at best, from the course looking outwards (exemplified in such questions as: "Will the content, skills and abilities be relevant to professional practice?", rather than looking inwards, that is, putting effort into identifying clearly the current needs of professionals and then considering how these needs might be met by a course. It is interesting to ponder why an emphasis on *context* in evaluation, as outlined by such researchers as Stake (1967, 1973, 1975) and Parlett and Hamilton 1972) in the 1970s, has not become a prominent part of the evaluation culture in higher education. In many cases data have been collected before the purposes of an evaluation have been determined; and, after an evaluation, course re-accreditation documents have reflected only minor modifications.

In an evaluation model for change, however, the goals on which the initial curriculum was based must be able to be changed.

GIVEN GOALS ⟶ NEW CURRICULUM GOALS

Any curriculum evaluation which is only based on given goals will inevitably not change to any great degree and then only within the prescribed curriculum framework. This is a far cry from the dynamic evaluation which is required, if we are to accommodate the significant issues and contingencies which are part of the changing health care environment.

Outline of a Dynamic Curriculum Evaluation Model

Our dynamic evaluation model incorporates an appraisal of the external and internal context of health care practice. The external context is explored in relation to changing social, economic and professional expectations, changing technology, internationalisation and award restructuring. The internal context is reviewed with respect to the changing abilities of students, the needs of academic staff and the changing roles of higher education institutions.

As revealed in the model, the external and internal environments of a course for health professionals pose a myriad of questions which can impinge on a number of curriculum perspectives:

* course content ... the disciplinary and interdisciplinary concepts, skills, abilities and attitudes;
* course delivery ... use of lectures, tutorials, workplace learning, independent learning, peer assessment, oral work, computer managed learning, facsimile, teleconference;
* course assessment ... empowerment in learning through self-assessment, use of a variety of assessment strategies such as oral, public presentations, clinical diagnosis and cross-disciplinary team work on problem-solving;
* other related issues ... staff development, resource issues.

The perspectives of the external and internal environment (Appendix) provide a checklist for identifying foci for curriculum change. It is important to note, however, that the entries in the checklist are intended to *serve as illustrative examples*, rather than as universally applicable absolutes. Equally, it is important to point out that more change can be generated through this model than can be accommodated realistically. It is essential, therefore, to target change and to develop priorities judiciously. It should also be stressed that this model will inevitably indicate the same or similar needs for change at different points in the same checklist. This may *ipso facto* assist in deciding on a sequence of priority in the change process.

A Framework for Course Evaluation

Current Course	Context Checklist	New Course
Goals	External Context	New Goals
	- changing societal expectations - changing professional expectations - changing needs for health care - changing uses of technology	
Course Content	- Funding	New Course Content
	- Internationalisation - (Global policy) - Overseas community - National policy	
Course Delivery	- Resources	New Course Delivery
	Internal Context	
Course Assessment	- Student - Staff - Institution	New Course Assessment

Conclusion

The need for an ecological approach to health is receiving worldwide recognition. Commensurately, we have argued that there is a need to adopt a dynamic, holistic approach to education of health professionals and, specifically in this paper, to curriculum evaluation and change.

In our experience, the global collective reflections of a group of health care educators, systematically organised, can yield positive changes to curricula far more efficiently than the purposeless or narrow focused data collection activities that often accompany the evaluation process. It is acknowledged that some judicious data collection activities could provide a useful adjunct to curriculum evaluation, but it is also argued that data are often collected in a mindless vacuum and at great expense. The mark of quality is the extent to which education prepares practitioners to improve future health care practice; and the holistic approach to curriculum evaluation, as illustrated by the present model, is deemed essential to the process of engendering truly worthwhile change.

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APPENDIX

Checklist for Identifying Foci for Curriculum Change: Some Illustrative Examples

External Context

1. *Changing professional expectations*

- Professional career structures
- Training guarantee
- Staff development
- Research
- Constraints

- Are professional objectives spelled out in terms of such things as:
  . to communicate orally and in writing with different communities;
  . to engage in professional development activities;
  . to reflect on the needs of the profession in relation to other health professions;
  . to identify community perceptions;
  . to establish links with other health professionals;
  . to use appropriate research skills?

What are the implications for course content/process?

- Are adequate communications skills being developed?

- Are there interdisciplinary units?

- Are students learning to reflect?

- Are problem-solving skills being developed?

What are the implications for course delivery?

- Should there be more experiential/ workplace learning?

What are the implications for course assessment?

- Have oral presentation and pamphlet design tasks been included?

- Have tasks on investigative techniques been included?

- What problem-solving and value clarification tasks have been included?

2. *Changing uses of technology*

Educational technology:
- Computers
- Telephone/Facsimile
- CD ROM
- Interactive Video Disc

What are the implications for course content/process?

- Which skills should be developed?

- What concepts should be developed?

- What ethical considerations should be incorporated?

Health care technology: - Drugs - Equipment	**What are the implications for course delivery?** - Could/should teleconferencing be used? - Could/should self-paced learning be implemented? - Could/should staff and students have access to hospital as well as university information networks? What limitations should be placed on access? **What are the implications for course assessment?** - Could/should educational technology be used to encourage self-paced assessment?
3. *Funding* - Constraints on new course development - Course innovation - Programme attrition - Attraction of outside funds - Over-enrolment	**What are the implications for course content/process?** - What are the key objectives? - Which skills are essential/non-essential? - Which concepts need to be learned, disregarded? - Which attitudes need to be developed, ignored? **What are the implications for course delivery?** - How can classroom contact be reduced? - Can more time be spent in the workplace? - How can the above be achieved? **What are the implications for course assessment?** - Can more self-assessment be used? - Can more peer-assessment be used? - Can assessment be made more efficient and effective? **Other implications?** - What sources are available for infrastructure funding? How can they be tapped? - Should students pay for access to learning resources? If so, which ones? - Can course administration be streamlined to conserve resources for teaching/learning purposes?

4. Internationalisation

- Internationally agreed framework of philosophy/attitudes, e.g.

  "Declaration of Alma Ata" (WHO, 1978)

  "Global Strategy for Health for All by the Year 2000" (WHO, 1981)

  "Ottawa Charter for Health Promotion" (Health and Welfare Canada, 1986)

  "Learning Together to Work Together for Health" (WHO, 1988)

  "European Charter on Environment and Health" (WHO, 1989)

What are the implications for course content/process?

- Is there a role for comparative studies?
- Should there be exploration of attitude clarification in the programme?
- Knowledge of reports?
- Applications of knowledge?

What are the implications for course delivery?

- What staff-student exchanges should occur?
- Should there be work experience programmes abroad?
- Should there be international teleconference, research link-ups.

What are the implications for course assessment?

- Assessment of overseas work placement?
- Assessment of attitudes versus knowledge and skills?
- Contributions to an international data bank?

5. ***Overseas students***

- e.g. Code of ethical practice in the provision of full-fee courses to overseas students by Australian Higher Education Institutions (1988)

- Legislation

What are the implications for course content/process?

- Are contextually specific terms clearly defined?

- Are comparative cross-cultural issues addressed?

What are the implications for course delivery?

- Are appropriate language and bridging programmes provided?

- Are students orientated to particular learning culture/expectations?

What are the implications for course assessment?

- Are specific criteria for assessment clearly stated?
- Is progress carefully monitored?

	Other implications? - Are staff development needs addressed with respect to managing the learning of overseas students?
6. *Community* - People - Industry - Social, physical and biological environment - Other resources	**What are the implications for course content/process?** - What skills needs to be developed in communicating with the community? - What are the community's perceptions? **What are the implications for course delivery?** - Should the course have special reference to the local community? - How can community resources best be used? **What are the implications of course assessment?** - Projects assisting in community empowerment or self-help? e.g. . Preparation of community pamphlets? . Magazine articles? . Talks to the community? . Community surveys, cooperatively designed with consumers?
7. *Government policy and guidelines* - Articulation of courses (e.g. links between university/technical and further education) - Equity - Staff appraisal - Performance indicators/ assessment of teaching - Research (e.g. policies for ethical clearance; targeted government funding) - Training guarantees - Professional career structures - Legal specification/limitation of professional responsibility - Labour force targets (numbers within specialisations) and employment assessment opportunities - Multi-skilling	**What are the implications for course content/process?** - Critical review skills? - Knowledge of reports? - Applications of knowledge? - Articulation of objectives? - Knowledge of health and safety? - Objectives related to changes in professional career structures? **What are the implications for course delivery?** - Multiprofessional learning? - Application of health and safety principles? - Process for ethical clearance for student research? - Opportunities for cooperative education (e.g. university in conjunctions with industry)

- Secondary school
- Accrediting agencies
- Copyright acts
- Health and safety legislation
- Higher education contribution scheme
- Reports e.g.
  "Looking Forward to Better Health" (Better Health Commissions, 1986)
  "Health for All Australians" (Health Targets and Implementation Committee, 1988)
  "The National Health Strategy: Setting the Agenda for Change" (Macklin, 1990)

What are the implications for course assessment?

- Critial review of reports?
- Surveys of knowledge?
- Applications of principles?
- Generic versus specialist knowledge and skills?

Other implications?

- Appraisal of staff practice?
- Focused staff development?
- Negotiation with other educational bodies?
- Provision of in-service programmes?
- Review of student entry groups?
  Access for disadvantaged groups?
  Recognition of prior learning?
- Transfer of credit between university and the other courses?

Internal Context

1. *Students*

- Percentage of students living locally and at a distance
- Different academic backgrounds
- Different language skills
- Different value systems
- Different experiences

What are the implications for course content/process?

- Incorporation of academic with language skills?
- Evaluation of individual differences?
- Clarification of personal values and goals?

What are the implications for course delivery?

- Integration of academic and language skill exercises?
- Experiences of alternative lifestyles?

What are the consequences for course assessment?

- Assessment of academic skills within two weeks of starting the course?
- Self-assessment?

Other implications?

- What are appropriate student entrance policies?

2. *Lecturers*	**Provision of professional development to extend skills in:**
- Lack of training for their academic role - Each with a unique contribution to make - Each with different skill levels in terms of knowledge of discipline and ability to communitcate it - Problems engaging appropriate staff in some areas - Varied ability to contribute to research - Increasing workloads in terms of hours and students - Lecturers have a discipline orientation - Lecturers' value systems, such as academic freedom	- Negotiation - Curriculum design - Programme development - Course delivery - Assessment - Evaluation - Interrelating with other health practitioners/ disciplines - Time management **Provision of guidelines on course/programme development** **Provision of opportunities for professional development in existing and new areas, through:** - Time for research, course evaluation - Secondment - Formal study leave - Varying roles and responsibilities **Recognition of commitment to teaching and programme development** - Recruitment criteria - Promotion criteria - Conference leave and support
3. *Institution*	**What are the implications for course content/process?**
- Other courses available - Facilities - Equipment - Other expertise - Structures - Financial/academic/political priorities	- Opportunities for interprofessional studies? **What are the implications for course delivery?** - Facilities available for different delivery modes? - Equipment available for teleconferencing? - Need to negotiate for more computers? - Link up with other institutions? - Implications for course evaluation? - Assistance available for assessment procedures? - Can assessment be self-paced?

Other implications?

- Appropriateness of course policies?
- Provision for advanced standing?
- Recognition of prior learning?
- Appropriate change strategies?

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A Multidimensional Approach to Evaluating a Changing Curriculum

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Abstract

This paper discusses experiences with a variety of methods which were used to evaluate a changing medical curriculum. While evaluators may be guided by these experiences it is emphasized that no single "evaluation template" fits all curricula; the peculiarities of each situation determine the optimal evaluation strategy.

Introduction

In 1988 the medical curriculum of the University of New South Wales in Australia underwent a significant change. It reverted to a six-year curriculum from a five-year course, which in turn had replaced a six-year curriculum established at the inception of the medical school. The recent change was made primarily to give students more time to reflect on their learning, to develop their skills in applying their learning in the basic sciences to clinical and community problem solving, and to have more exposure to clinical experiences. A specific condition was that there should be no net increase in the content of the curriculum, except in certain identified areas which were thought to be of current importance.

Concurrently with the change, the Curriculum Committee of the Faculty of Medicine instituted a sub-committee, the Course Evaluation Committee (CEC), and appointed one of the authors (RB) as its Chairman.

The specific terms of reference of the CEC were:
1) to determine the extent to which the objectives of the new curriculum were met; 2) to compare each year of the new curriculum with the corresponding year of the old curriculum; and 3) to determine whether the new curriculum prepared students better to apply the knowledge they gained from each year of the course, to the situations they encountered in the succeeding years and in future practice.

In addition to its Chairman, the CEC consists of the Dean of the Faculty of Medicine, the Chairman of its Curriculum Committee and the Chairman of a relevant Year Committee. It reports directly to the Curriculum Committee on which the Chairman of CEC sits. In addition, the latter is invited to meetings of the relevant Year Committee where CEC

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reports are discussed. The Year Committees are also sub-committees of the Curriculum Committee.

The CEC focused its evaluation activities mainly on the objectives of the change. It evaluated: 1) each course within a given year as a whole, rather than its detailed content or the effectiveness of individual teachers within it; 2) the links among courses at horizontal and vertical levels; 3) the relative emphases on topics within the courses in relation to priority health needs; and 4. the total impact of the courses within a year on the students in that year. Detailed analysis of course content and teacher evaluation were left to each department. Most departments already conduct teacher and subject evaluation; others have sought the help of the CEC in setting up such evaluation.

The evaluation plan established by the CEC incorporated input, process and product evaluation. Product evaluation will be undertaken when the last of the five-year, and the first group of the six-year students respectively commence their intern training.
This report deals mainly with process evaluation conducted over the last four years.

Methods

1. Staff and Student Survey

At the outset the CEC decided to evaluate each year of the new curriculum, which was being phased in on a yearly basis, only on the first occasion when it was introduced. This inevitable resulted in the same cohort of six-year students responding to the evaluation instruments each year. As the evaluation was partly a comparison with the old curriculum, it was necessary to evaluate the corresponding years of the old curriculum as well simultaneously. The project started too late to evaluate the first year of the old curriculum as it had already been replaced by the first year of the new curriculum. However, evaluation data gathered by the individual departments during the previous year were available to the CEC. As for the remaining four years of the old curriculum, the CEC was able to conduct its own evaluation as these years were still in the process of being phased out. Rather than the same cohort of five-year students responding to the evaluation instrument for all four years, responses were sought from different cohorts for each year over the first three years of the project.

A modified Delphi technique (Delbecq et al., 1975) was used to seek perceptions of staff and students for each year of the curriculum. About midway through a particular course, individual interviews were conducted with course coordinators and corresponding heads of departments. Their perceptions about the strengths and weaknesses of the course, and their concerns and problems encountered were determined. Approximately one-third to one-half of the students in that year were then interviewed in groups of 10-15. At these interviews student opinion was sought on staff perceptions. In addition, students were encouraged to contribute their own perceptions. The information gathered from staff and students was used to develop a student questionnaire, addressing specific issues for the particular year. This questionnaire was distributed to the relevant staff for comment and amendment (if necessary) before being administered to students, including those who failed, as they re-enrolled in the following year. Student responses were collated and analysed, and a preliminary report was sent to the Dean, Chairmen of the Curriculum and corresponding Year Committees, and the heads of relevant departments. The latter received only data pertaining to their own courses, whereas the others received data pertaining to all courses in that year. Course coordinators were asked to prepare evaluation reports on each of their courses from the student feedback provided by CEC, and from the data from "in-house" evaluations carried out by the department. This report included, in addition to the results of evaluation, the course objectives, examination results, innovative approaches, and changes made or recommended.

A similar process was followed for the corresponding year of the old curriculum. A draft report for the year was prepared by the CEC, summarising the perceived strengths and weaknesses of each course from the staff and student points of view, comparative data for old and new curricula and changes made as a result of the evaluation. This report was again sent to staff for comment before being finalised and distributed to relevant authorities for discussion at a Year Committee Meeting.

2. Comparison of Performance on "Marker Questions"

Old and new curricula were also compared on the basis of student performance on common ("marker") questions, essay and multiple choice questions (MCQ), set in end-of-course examinations. For obvious reasons, only a small number of questions could be repeated each year. This comparison was abandoned in the later years of the course due to lack of equivalence between old and new curricula in these years.

3. Analysis of Written Examination Papers

Written examination in this medical school have traditionally been open-ended (long and short essay) and fixed-response (MCQ). In 1990, examination papers of each type, set in all courses, were analysed separately for old and new curricula, to determine frequency of content areas examined as in a previous study (Rotem et al., 1982). Content areas were classified according to organ systems, conventional topics and those of current importance to Australian health care. The purpose was to determine content areas which were over- or under-emphasized in the curriculum.

4. Objective Structured Clinical Examination (OSCE)

This study determined the extent to which third year medical students learned to apply their basic science knowledge in the clinical situation - one of the objectives of the curriculum change and of the clinical studies programme in Year 3. The OSCE consisted of five pairs of stations, each with a test of basic clinical skills and application of basic sciences to that clinical skill. The test was conducted on a sample of third year students at the beginning of the year and repeated towards the end of the year, before their end-of-year examination.

Differences in pre- and post-test scores of those students who sat both tests were determined. Perceptions of participating students and examiners about the method of examination were surveyed.

5. Process Observation of Clinical Examinations

Some concern had previously been expressed about the manner in which clinical examinations (long and short cases) were conducted in Year 4 of the old curriculum. The research team observed the clinical examiners at the end of the last 4th Year of the old curriculum. An observation schedule was used to collect data on student examining practices in all four teaching hospitals. The results of the survey were fed back to the Integrated Clinical Studies Committee.

Outcomes and Discussion

The multidimensional approach to evaluating the changing curriculum enabled curriculum process and product to be evaluated in quick succession for a given year. Thus process evaluation of Year 2 of the new curriculum had first been undertaken when its products, Year 3 students, were evaluated, through the OSCE, on their ability to apply what they learned in the basic sciences to clinical situations. Awaiting product evaluation to warn that something is wrong **before** undertaking process evaluation to determine what is wrong has certain drawbacks. Firstly, the process may have changed by the time deficiencies in the product become evident. Secondly, even if the process has not changed, its weaknesses would have affected many classes of students before corrective measures are taken. As Cronbach (1966) stated, "Evaluation used to improve a course while it is still fluid contributes more to improvement, than evaluation to appraise a product placed on the market." Deficiencies detected through the OSCE, for example, were pointed out to preclinical staff, so that corrective measures could be taken immediately for the succeeding group of students.

Another advantage of multidimensional evaluation was the ability to cross-check findings. Thus, for example, gaps in examined content areas, identified through analysis of the question paper, could be corroborated through the modified Delphi survey.

With the limited personnel resources at our disposal, the modified Delphi survey could be undertaken only on one year of the new curriculum at a time. Thus the first cohort of six-year students have participated in the survey in successive years over the past four years, and would continue to do so until they graduate. It has often been stressed that, in evaluating an innovation, care must be exercised in drawing conclusions about the new programme based on an analysis of the initial class. The "pioneer effect" of the first class is analogous to the well known Hawthorne effect in industry. Ideally, until an innovation has been stabilised successive classes should be evaluated. The other drawback of our strategy is the "fatigue" that could develop in the same group of students surveyed year after year. Fortunately, our experience has belied this thus far. The response rate has been high, and students have expressed their willingness to provide feedback on the year they have just completed, even though they are aware that any changes would not affect them. The advantage of the strategy is the immediacy of the feedback, enabling course coordinators to take corrective action if they so wished. The student survey was so timed that it lacked threat, though some implicit coercion may have resulted through questionnaire administration at the time of enrolment for the subsequent year.

Providing teaching staff with an opportunity to comment at each stage of the evaluation process should have engendered in them a feeling of ownership and commitment. Occasionally, however, some staff criticized the questions asked **after** the results were known, even though they did not object to the draft questionnaire **before** its administration. Such criticism, particularly obvious when results were unfavourable, could have been a defensive reaction to negative findings. The extreme form of defensive reaction was occasionally expressed in statements such as: "These are merely student perceptions", or "How valid are they anyway?" In spite of such comments, however, staff are concerned about negative student perceptions and do take steps to address them in succeeding years.

The curriculum was changed for specific reasons. The evaluation project compared old and new curricula to determine whether the change resulted in the desired effects. Evaluating corresponding years of each curriculum, while permitting such comparison, also enabled deficiencies detected in a given year of the old curriculum to be addressed when the corresponding year of the new curriculum was first implemented. As the new curriculum progressed, however, a lack of equivalence between the corresponding years of the old and new curricula made comparison difficult and even meaningless.

The strategy of using "marker questions" to compare the abilities of students in the old and new curricula was borrowed from a method used by the Royal Australasian College of Surgeons to maintain uniformity in minimum pass levels in the Part 1 examination (Cox and Royle, 1980). In those examinations, which are composed of multiple-choice questions, at least one-third of the questions are repeated from previous examinations. In our study, repetition of questions in successive years was not feasible to that extent. Understandably, most examiners were reluctant to repeat too many questions, and a few examiners any at all, from the previous year. The small numbers of questions precluded statistical comparisons. Lower mean scores in the new curriculum pointed to those areas which required closer scrutiny.

With the lengthening of the new curriculum the sequence of subject areas changed. This change, together with longer clinical exposure, made establishing equivalence between specific years of the latter parts of the old and new curricula increasingly difficult. The "marker questions" study was thus abandoned after the third year of the new curriculum.

Clinical teaching staff were regularly reminded of this lack of equivalence. In a given year, their expectations of students had, necessarily, to be different in the new curriculum from what they were accustomed to previously. Such differences also have important implications for external examiners who examine students in curricula which are different from those they are accustomed to. External examiners must familiarise themselves with the objectives of the course in which they examine.

The real objectives and priorities of teachers are often evident from the areas in which they examine students. This assumption underlay the analysis of written examination papers set in the previous five years. From this study over- and under-emphasized content areas were identified across the whole curriculum. Rarely do staff consult each other across departments in setting examinations; often they are unaware of areas examined by others. As a result an appropriate balance in the examination of subject areas is left to chance. This study also determined the extent to which emerging health needs were examined. Students are known to learn towards examinations. They review previous question papers and seek advice from their senior colleagues to obtain clues about the idiosyncrasies of particular examiners.

In general, this study found that the written examinations set in the school, across the curriculum as a whole, were well balanced. Some significant gaps were, however, revealed and were a source of concern. It is hoped that, as the new curriculum becomes established, these deficiencies would be rectified.

One objective of the change was to develop students' skills in the application of basic sciences to clinical settings. The OSCE study was devoted specifically to determine whether the new curriculum was achieving this objective.

The third year marks a watershed between the pre-clinical and clinical phases. A clinical course in the third year, labelled Clinical Studies III, has two major objectives: the development of basic clinical skills and of the ability to apply the basic medical sciences, learned in the first two years, to clinical situations. The OSCE pre-test revealed an inability, on the part of the average student, to demonstrate these skills at the beginning of the third year. Deficiencies in application were disappointing as, ideally, some vertical integration should have taken place in the pre-clinical years. Students learn basic sciences best when they see the relevance of the sciences to their future professional life, through application and problem-solving. Nevertheless, it is important, at least by the end of the third year before the basic medical sciences are forgotten, that the clinically relevant components are reinforced through application. The OSCE was standardised, as far as possible, using similar patients and simulated patients, the same hospital setting, and at least one examiner in a pair who participated on both occasions. Comparison was made on the mean performances of only those students who participated in both examinations.

The OSCE study had a hidden objective. Though this technique had previously been tried out, mainly as a teaching device, it had not been established as a formal procedure in the school's repertoire of assessment devices. The OSCE was used as a trial in the third year to determine its feasibility and acceptance to staff and student. The overwhelming majority of staff and students who participated in the examinations expressed satisfaction with the method and the desirability of continuing it in future years. The Faculty has now accepted it as a method of assessing students in the Clinical Studies III course.

Both the OSCE study and the process observation of clinical examinations in Year 4 demonstrated how difficult it is to change practices ingrained in senior clinical examiners. Nevertheless, it is our belief that the only path to change is through regular feedback and guidance. The improvement in examination technique from the OSCE pre-test to the post-test was obvious. It is expected that this improvement would be carried over to the Year 4 clinical examinations. The observational study of the last Year 4 of the old curriculum was preparatory to an improved clinical examination in Year 4 of the new curriculum in the following year. As a result of this study a set of guidelines was developed for Year 4 clinical examiners. The study was not repeated to determine the extent to which improvement in technique had really occurred.

The evaluator's task usually stops with reporting results to the relevant audiences. However, especially in the case of internal evaluations such as this, it is imperative for the evaluator to assist the decision-makers in the use of the findings to make desirable changes. In this study one of the authors was a member of the Faculty Curriculum Committee and of two of the Year Committees. In addition he was invited, by virtue of his role as Chairman of the Course Evaluation Committee, to all meetings of the Year Committee whose courses were being evaluated in a given year. Such attendance was mutually valuable, from the point of view of clarifying findings and suggesting alternatives, and for planning future evaluation activities through insights into Committee decisions.

The manner in which committee members reacted varied. Some considered the results item by item, discussed possible reasons and suggested ways of improving the following year. Others assumed a more defensive posture, attempting to justify weaknesses rather than attempting to correct them. Still others were sceptical of student feedback, dismissing it as mere perceptions of those who "really did not know what they need".

Several positive outcomes resulted from the evaluation. Firstly, a Faculty-wide awareness of the importance of evaluation was generated. This can largely be attributed to the high priority given, and seen to be given, to evaluation by the senior administrators of the School. Secondly, there was more interaction on curricular issues among teaching staff of different departments. As a result, they became increasingly aware of each other's contributions to the curriculum. Thirdly, definite changes took place as a result of the evaluation, though more limited than expected. Sometimes these changes were attributed to the department's internal evaluation rather than to the CEC's project. The CEC insisted, however, that in its final report all evaluation findings were considered together, irrespective of source. On this basis, any positive change brought about was considered worthwhile.

On one occasion at least an attempt was made to misconstrue an evaluation finding in such a way as to achieve a department's hidden agenda. Students' perception of "work overload" in a particular subject was construed as "inadequate time" for that subject, and attempts were made to increase the curriculum time. This would have gone against one of the principles of the curriculum change and had to be resisted, lest the primary objectives of the curricular change were perverted.

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Charting the Winds of Change: Evaluating Innovative Medical Curricula*

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Abstract

The increased interest, in North America and around the world, in problem-based and community-oriented medical curricula has sparked interest in the evaluation of these innovative programmes. In January 1989, the Josiah Macy Jr. Foundation sponsored a conference to consider designs for evaluation studies and the potential distinctive outcomes of the innovative curricula that might be foci of these studies. After defining an "innovative curriculum", the participants identified seven characteristics of "important evaluation studies", particularly endorsing studies that compare curricula as whole entities. The participants then identified 26 areas where differences between graduates of innovative and traditional curricula might be expected, and five equally important areas where differences are not expected. Distinctive outcomes of innovative curricula were

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anticipated in areas such as interpersonal skills, continuing learning, and professional satisfaction. Overall, these recommendations are offered to stimulate creative evaluations of the growing number of innovative programmes in medical education.

In recent years, medical education has been enriched and challenged by a number of large-scale curricular innovations. Whereas in the 1950s the programme at Western Reserve was essentially the lone alternative to the conventional model, many North American schools are now experimenting with the curriculum in varying ways. Some of these innovative programmes - at Brown, McMaster, Michigan State, New Mexico, Rush, and Southern Illinois - have existed for many years. More recently, innovative programmes have been established at Bowman-Gray, Calgary, Harvard, and Sherbrooke. Looking beyond North America, schools at Beer-Sheva in Israel, Newcastle in Australia, Maastricht in The Netherlands, and Suez Canal in Egypt, among others, have well-established curricula that are clear departures from convention in their respective nations. Worldwide, many of these innovative approaches fall under two labels - "community-oriented" and "problem-based" - but these rubrics by no means typify all of the models in place. Schools with community-oriented or problem-based programmes have established an international network to promote attainment of their common goals through joint efforts and information exchange (Kantrowitz et al., 1987; Richards et al., 1989).

The established innovative programmes attempt to address problems of contemporary medical education highlighted in recent reports (Muller, 1984; Gastel et al., 1989; Bok, 1984; Friedman et al., 1983). For example the procedures of problem-based learning reduce the emphasis on passive learning of detail during the preclinical phase of education. Yet such changes in the educational *process*, however salutary they may appear, do not ensure the desired *outcomes* of these changes. These outcomes, as described for problem-based learning, include greater ability to integrate the basic and clinical sciences and superior independent learning skills (Barrows, 1983). Studies are required to determine whether the hypothesized linkage between processes and outcomes actually occurs.

Although there is much interest among North American medical educators - in the problem-based approach, particularly - over 90% of North American schools operate traditional programmes. Although curriculum change is a deliberate process for many reasons, demonstrating positive educational effects at the medical schools where the innovative approaches are used may be a necessary condition for widespread dissemination of these approaches to other sites. For many constituencies, these positive effects would need to be enduring and not counterbalanced by negative effects in other areas. Medical faculties universally trained in the scientific method may be particularly inclined to demand empirical evidence before undertaking a curriculum change of significant magnitude.

Determining empirically whether these innovative curricula produce a "different kind of doctor" is the role of programme evaluation. There appears to be general agreement that such evaluation studies should be done, and indeed, many schools have studied various aspects of their own programmes (Schmidt et al., 1987; Woodward et al., 1988; Kaufman et al., 1989). There is less consensus regarding what should be studied and how. The work performed thus far has sprung largely from local needs and interests and from the methods preferred by the researchers at each school. This is understandable, as many of the studies have derived from needs to establish the legitimacy of each innovative programme. But this stage seems to be past. With McMaster, Maastricht, New Mexico, and others leading the way, the ability of these curricula to produce competent physicians has been generally established (Kaufman et al., 1989; Woodward, 1984; Verwijnen et al., in press), although further studies of this question may still be desirable. Shorter-term concerns about survival of these innovative curricula are being supplanted by longer-term interest in understanding their unique effects.

A Conference on Evaluation

There is need for a coordinated approach to evaluation of innovative medical curricula. This need relates to the shifting of focus from legitimacy to distinctiveness, which allows schools to explore issues of more general as well as primarily local interest. It also stems from the difficulty of conducting evaluation studies that will be credible in the scientific community (House, 1980). To generate results that faculty and administrators - both within and outside the innovative schools - will find persuasive, studies must address important questions and employ carefully conceived methods matched to these questions. It follows that evaluations will be expensive and time-consuming. Coordination among researchers conducting or planning to conduct such studies can generate findings that highlight key issues and are comparable across settings.

To help focus and coordinate programme evaluation efforts, the Josiah Macy Jr. Foundation sponsored a conference hosted by the University of North Carolina School of Medicine in Chapel Hill. The conference involved the eight individuals who are the authors of this paper. While the participants were based exclusively at North American institutions, several are well-versed in innovative curricula operating elsewhere through their personal activities and through their association with the international Network of Community-Oriented Educational Institutions for Health Sciences (Kantrowitz et al., 1987; Richards et al., 1989). Planning for the conference began in October 1988; the group met January 6 and 7, 1989, to generate the recommendations reported here.

The specific aims of the conference were: 1) to consider designs for systematic, comparative studies of students trained using innovative curricular models and their counterparts in traditional curricula; 2) to identify distinctive outcomes of innovative curricular models that might be the focus of these studies; and 3) to determine which studies should have high priority for future efforts.

In addressing these aims, the participants first considered what it means for a curriculum to be innovative and what characteristics of such programmes would give rise to a different product. Attention then turned to general characteristics of evaluation studies that would justify the time and effort to do them well. With these consensus points as a background, a set of more specific recommendations was generated. One is a listing of areas where differences between innovative and traditional curricula might (and might not) be expected, with a special focus on clinical problem solving. The other recommendations identify five high priority areas for study and suggestions for study designs for each of these areas.

What follows is a consensus statement reflecting the best judgment of eight individuals who share interests in curriculum innovation and programme evaluation. The recommendations are offered in the spirit of suggestion and stimulation rather than prescription.

Defining an Innovative Curriculum

From the outset, the participants recognised the need to set boundaries for their deliberations: to identify the domain of current and future curriculum innovations that would be the objects of their recommendations. This is necessary because all medical schools innovate to varying degrees, in different subject areas, at different times. Also, innovation is a profoundly relative term. What is innovative at one institution, or to a particular set of members within that institution, may be recognised as established practice by others.

Programmes termed "innovative curricula" for the purpose of these recommendations have the following characteristics: 1) they operate on the scale of the entire curriculum leading to the degree in medicine, or a significant fraction of it. A programme addressing, in toto, the two years of preclinical education would qualify by this standard; 2) they are guided by some stated, coherent sense of purpose. At some institutions, the purpose is conveyed through labels such as "problem-based learning" or "community orientation". Other schools have developed new curricular models more eclectically, adapting for their own needs elements of problem-based and community-oriented approaches without adopting the terms. Nonetheless, in every school operating an innovative programme there is an explicit set of goals guiding the effort; and 3) they involve all medical students or an identifiable subset of students at a school. If a programme involves all students, it must stand as a clear point of departure from standard educational practice in that country. If it involves a subgroup of students, it must involve a group that remains intact with a distinct identity.

At least ten schools in North America operate programmes with these characteristics. The characteristics are stated in generic terms to focus attention on the principles underlying the programmes rather than the specific schools that host them, and in recognition that this number may change.

Educational Context of Innovative Programmes

Before proceeding to recommend specific designs for evaluation studies, the participants explored some basic questions: Why should these innovative programmes be expected to produce distinctive effects? What attributes would give rise to such effects? Since decades of research have shown that distinctive outcomes of alternative educational approaches tend to be weak and ephemeral (Dubin et al., 1970; McKeachie, 1978), there are ample grounds of scepticism about the current innovative programmes in medicine. In considering these questions, the conferees noted a significant feature common to the programmes within the domain of its deliberations. Each programme creates a distinctive educational context that is a composite product of the admissions criteria that determine the character of the student body; the values of the faculty, who often self-select into the programme; the formal and informal educational activities that are part of the curriculum; and the character of the communication and personal relationships among students, faculty, and programme administrators. The importance of the context, milieu, or total environment of a programme has been noted by writers on programme evaluation (Hamilton et al., 1977). By creating a complete and alternative educational environment, innovative programmes can engender significant effects expressed in the knowledge, skills, behaviour, and attitudes of their graduates.

The distinctive effects of innovative curricula, detectable through empirical studies, will result from the total context of the programme. Wherever possible, evaluations should focus on these effects of the programme as a whole. Less important are reductionist studies seeking to ascribe specific differences in outcomes to specific aspects of the educational programme. (For example, are graduates more "humanistic" because of the programme's admission policy or because of the community-oriented educational activities?) Many proposed studies have been criticized because they cannot isolate the specific aspect of the programme that is generating an effect. The present recommendations would temper these criticisms. Each element of the programme works in harmony with other elements to create the context. The context is the direct source of the effects.

Characteristics of Important Evaluation Studies

Narrowing the alternatives is a major challenge to any programme evaluation. Educational programmes are complex and can be studied from a virtually infinite number of perspectives. The conference group identified the following as characteristics important to evaluation studies:

1. *Emphasize outcomes.* Studies should explore whether the innovative programmes generate a distinctive product, as reflected in the behaviour of trainees themselves or the health of the patients they care for. Differences in educational process are of interest to the extent that they contribute directly to desired educational effects.
2. *Explore effects that are reasonably enduring.* An effect that exists ephemerally, only at the end of the innovative phase of training, is of less interest than an effect that persists

months or years later.

3. *Can be concluded within a decade.* Many studies of interest are necessarily longitudinal, but ten years is as long as the community can be expected to wait for important findings.

4. *Are of interest to those who will make decisions about the continuation or adoption of these educational approaches.* Researchers with training in the behavioural or social sciences might value measures that connect to the scholarly literature on human learning; however, those who control resources and access to the profession may have primary interest in measures with close ties to institutional administration and activities of professional practice.

5. *Have potential to generate reasonably large effects.* Longitudinal studies can involve many hundreds of subjects. With such sample sizes, effects of little practical interest can still be significant statistically. The variables studied should be those where reasonably large, rather than merely statistically significant, results are expected.

6. *Have not been undertaken already.* With the large number of interesting studies that can be done, the field cannot yet afford studies that are purely replications of previous work, in the absence of clear justification.

7. *Cannot be performed routinely.* A great deal of data that can be used in evaluation are generated by the routine operation of a programme. These routine data can be used in curriculum evaluation but they cannot alone answer the important questions. The most informative studies will employ data collected as part of specially designed, prospective research efforts.

Studies in accord with these guidelines will enhance understanding of innovative programmes and inform decisions on potential adoption of these programmes by other schools. The results may also help schools with innovative curricula make their programmes more effective.

Where Differences Are and Are not Expected

In curriculum evaluation, demonstrations of "no difference" are often as important as demonstrations of differences. If, for example, the general belief among educators is that the innovative programmes are more costly per student, a finding that the costs are equivalent will be of great interest even though, in experimental terms, this is a null result. For this reason, the conference group directed attention to both kinds of outcomes: where differences are, and are not, expected.

As shown in Table I, the deliberations generated a list of 26 specific areas in which educationally significant differences might be expected when comparing students or alumni from innovative and traditional curricula. The anticipated differences can be grouped into six clusters, also given in the table. This list is suggestive rather than exhaustive, intended to direct attention to a useful set of targets for evaluation studies. Individual items in the list will be more applicable to some curricula than others. The differences are listed without an assertion of directionality, although most studies will

Table I. Hypothesized areas of difference between traditional and problem-based and/or community-oriented curricula

Psychosocial and Interpersonal Skills

1. Sensitivity to individual patient needs
2. Interest in primary prevention; awareness of and ability to use community resources
3. Appreciation of the effects of a disease on the patient's family
4. Sensitivity to the context of a patient's life; for example, occupational risk factors, his/her social group and role in the community
5. Ability to work efficiently and effectively in a diverse team
6. Degree of competitiveness within the medical student body.

Continuing Learning

7. Keeping up to date in both traditional and innovative ways; modifying practice activities in accord with changing biomedical knowledge
8. Mastering and maintaining skills related to information access and information retrieval
9. Habitually filling perceived gaps in medical knowledge.

Professional Satisfaction

10. Levels of student and faculty satisfaction with their circumstances in medical school
11. Rates of burnout, dropout, impairment, and mental health problems among practitioners
12. Practitioners' satisfaction with their careers, particularly the day-to-day work of clinical practice.

Practice Behaviour

13. Amount and judiciousness of prescribing
14. Initiative in maintaining a programme of patient care; for example, by active follow-up to ensure compliance
15. Referral patterns (which problems are referred and which are treated by graduates in primary care)
16. Proportion of graduates who practice primary care
17. Extent to which graduates conduct research in the context of their patient care activities
18. Extent to which graduates participate in community activities
19. Extent to which graduates are "risk takers" or advocates for social issues affecting health.

Educational Achievement and Cognitive Development

20. Scores on board examinations and other tests of knowledge*
21. Knowledge of the basic sciences when that knowledge is displayed in the context of clinical problems
22. Rate of professionalisation (socialisation into the profession)
23. Rate of ethical and cognitive development.

Institutional Issues

24. The popularity of the school and programme as interest in medicine generally declines
25. Extent of alumni contact with and loyalty to their school
26. Differences in the faculty value system, particularly with regard to education as a component of the institutional mission.

*A difference favouring traditional curricula is posited here.

likely be conducted with the expectation of finding differences favouring the innovative programmes. However, with regard to performance on traditional standardised tests of basic science knowledge (such as the NBME Part I), the group's general expectation is that students in traditional curricula will outperform those in innovative programmes. Some differences that exist at the completion of the medical curriculum may be negated by postgraduate training; where this is expected, studies should be conducted at several times.

The group also identified five areas where differences are *not* expected, as summarised in Table II. Taken together, these items imply that both innovative and traditional curricular models will produce graduates prepared for further clinical training and ultimate practice, and that both will be equally costly in the steady state. However, cost may be a differing function of class size for the two types of programme. Costs per student for traditional curricula will decrease as class size increases, while comparable costs of innovative curricula may increase with increasing class size. While the programmes may be equally costly when viewed over all schools, an individual school may find one type of programme more costly, depending on the school's class size.

For studies of innovative curricula, the "no difference" hypotheses listed in Table II are as important as the areas of potential difference posited in Table I. Studies directed at clinical problem solving of common medical problems are a special issue discussed in detail below.

Table II. Hypothesized areas where no differences are expected between traditional curricula and problem-based and/or community-oriented curricula

1. Passing rates on licensure and certification examinations

2. Likelihood, in practice, of making a major clinical mistake

3. Clinical problem solving around common, uncomplicated presentations of disease

4. Educational costs per student (in the steady state, after start-up, costs of innovative programmes attenuate)

5. Cost-efficiency of graduates as practitioners.

Clinical Problem Solving

The conference group viewed clinical problem-solving proficiency as the ability to "work up" efficiently a patient with a common medical problem, reaching an accurate diagnosis and formulating an appropriate plan for management. It is tempting to hypothesize that the innovative curricula would increase students' problem-solving proficiency. In community-oriented curricula, significant clinical experience begins early in training with a focus on common problems and primary care. In problem-based curricula, the first and second years are based on a sequence of clinical problems. Although these problems tend to be paper cases rather than live patients, the problem-based approach introduces clinical reasoning - the use of objective and subjective findings about a patient to infer the presence of specific diseases - at a very early stage. In contrast, in traditional North American curricula, significant clinical training does not begin until the third year and the most common setting is the tertiary care hospital.

Use of the traditional model is supported by what may be termed a "trickle down" theory of learning in clinical medicine. According to this theory, complicated medical problems seen in tertiary care centres are superpositions of simpler problems. It is presumed that a student who can manage a complex problem in a tertiary setting can also manage the individual components of this complex problem as they arise in primary care settings. Innovative models for clinical curricula run counter to this assertion, arguing that it is difficult for students to separate the components of a complex problem in a very sick patient and thus "obtain valid impressions of the over-all health problems of the community" (White et al., 1961). Students have less appreciation of diabetes mellitus as it usually occurs in the population if they interact only with patients who have diabetes with extensive complications. This view leads to an emphasis on training in settings where students are exposed to problems to the extent that, and in the form that, these problems occur in the general population.

On balance, however, there should be no enduring differences in basic clinical problem solving between students in innovative and traditional programmes. Students develop proficiency in areas where they get more practice and exposure. Basic problem-solving skills will likely be equivalent across programme types, not because these skills "trickle down" from tertiary care experience in traditional schools but rather because all curricular models try to provide an adequate level of direct exposure to uncomplicated presentations of common medical problems, and most succeed. While students who graduate from these various programmes are not likely to differ in problem-solving proficiency across large numbers of common medical problems, students within schools may differ idiosyncratically as a consequence of the specific clinical experiences they are assigned or elect. This is, furthermore, an area where any differences existing at graduation will attenuate during residency.

Recommendations for Outcomes of Highest Priority

Tables I and II list a large number of outcomes of potential importance in studies comparing innovative and traditional curricula. In a world of limited time and resources, priorities distinguish what actually occurs from what is merely planned; therefore, the group concluded its deliberations by considering five outcome areas that appeared deserving of

Table III. Specific recommendations for evaluating five important outcomes of curricula

Outcomes	**When studies should be done**	**Proposed methods**	**What is needed most**
Psychosocial and interpersonal skills cluster	When students and graduates are working with patients	• Simulate "difficult" patients or patients with psychosocial problems • Conduct surveys asking patients to assess the psychosocial skills of practitioners	Since many measurement techniques exist, design and logistics of studies is the major challenge - particularly obtaining large sample sizes
Continuing learning cluster	After five or more years into practice	*Find out:* • Do they know the latest? • How do they keep up? • Rates of practice change and why they change • Do they influence the practice behaviour of colleagues? *Study scores on:* • Recertification exams • Technical skills exams	Studies using a variety of methods and having enough subjects at enough sites to be informative
Satisfaction cluster	At regular intervals during school and after	Interview and mail surveys	More studies of faculty and practitioner satisfaction since most schools are already addressing student satisfaction
Clinical problem solving (No difference expected)	Early in clinical training, after clerkships, at graduation, perhaps after internship; once trainees specialise, a generic exam is no longer practical	Various types of clinical simulations and vignette-based multiple-choice questions	A consensus on what are "common problems"; it is not clear schools will agree when specific case problems are designed
Cost of education (No difference expected)	During start-up phase of a programme, then continuing at least five years into a programme's operation	Time-and-motion studies of faculty and staff activity, so their time devoted to education can be computed	• Studies comparing direct costs of innovative and traditional education • Studies computing start-up costs vs. steady-state costs for new programmes • Studies examining cost per student as a function of programme size

the most, and the most immediate, attention (see Table III).

Two of the five high-priority areas are those where no differences are expected: clinical problem-solving and cost of education per student. Clinical problem solving, as discussed in the previous section, is so fundamental to the mission of medical education that it requires continuing exploration. The importance of comparing programme costs is self-evident as financial pressures on academic medical centres mount and programmes must justify themselves on fiscal as well as educational grounds. Schools considering the adoption of an innovative curriculum face substantial planning and start-up costs. These start-up costs will be particularly difficult to justify if the steady-state cost of operating the new programme is substantially higher than what it replaced.

The other three high-priority outcomes address areas where differences between innovative and traditional curricula are anticipated. These include a cluster of outcomes relating to psychosocial factors in patient care and interpersonal skills, a cluster related to continuing learning, and a third cluster bearing on satisfaction of students and faculty with their education and practice. If the innovative curricula are going to make a difference, the participants believe these to be the important domains where the differences will be found. It will be important to track these differences over time to see whether they remain after residency and into practice. The importances of psychosocial issues (Engel, 1977) and continuing learning (Manning et al., 1987) in contemporary medical practice have been widely discussed. The importance of satisfaction as a generic dimension of study stems from the literature on physician impairment (McCue, 1982; Logan, 1989) as well as more recent studies of stress and depression in medical students (Witaliano et al., 1989; Spiegel et al., 1986).

Table III elaborates on study designs for each of the five outcomes, when in the continuum of medical education measurements should be taken, methods of measurement or assessment that might be employed, and what specific efforts are most needed to complement what is already being done. In all study designs, sample size and statistic power emerge as important considerations. In areas where differences between programmes are expected, sample sizes must be sufficient to detect the differences that are educationally meaningful. In areas where no differences are expected and none are found, an adequate sample size will lend credence to the results.

Conclusions

Four general themes emerge from these deliberations. First, if the innovative programmes do engender distinctive effects observable in their students or graduates, this may be due to the pervasive context stemming from the values of faculty, students, and administrators and reflected in how the educational experience is organised. It is difficult, and it may prove impossible, to attribute effects of alternative curricula to specific component parts. Evaluation should emphasize comparison of curricula as whole entities.

Second, any study worth doing is worth doing well enough to ensure that the results are not clouded by conceptual or methodological shortcomings. Each study will, therefore, be time-consuming and costly. As a consequence, studies should address important issues and should be coordinated across sites to use redundancy to advantage. In general, studies that are pure replications should have lower priority than studies that address novel questions.

Third, the specific curricular outcomes worthy of study include areas where differences are not expected, as well as areas where differences are expected. While there is a tendency to give second-class status to studies with "no-difference" findings, studies of medical problem solving and educational costs are very important in the comparison of traditional and innovative programmes of medical education.

Fourth, the expected distinctive outcomes of innovative curricula fall into categories such as interpersonal skills, continuing learning, and professional satisfaction. These are extremely important aspects of professional practice and well justified as foci for evaluation.

It is the authors' hope that systematic study of innovative medical curricula, in North America and worldwide, will grow as the number and longevity of innovative programmes increases. The results of thoughtful, well-designed, well-executed studies, whether or not they favour the innovative programmes, will benefit everyone who works to improve medical education.

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Some Reflections on Evaluation of Outcomes of Innovative Medical Education Programmes during the Practice Period*/**

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Abstract

Innovative medical schools have reached a stage of maturity where they can begin to enquire into the outcomes of their curricula in relation to their graduates and any more wide ranging influence on other educational institutions. What questions should be addressed that concentrate on major implications and can be expected to endure over time and are thus of interest to decision-makers? What questions can be addressed that take into account constraints, as well as opportunities? Reality emphasizes that undergraduate education alone does not determine the performance and behaviour of graduates; the influences of postgraduate education and those of the practice environment are superimposed. With whom should the graduate be compared? Numerous variables need to be considered, and bias, such as that of student selection, needs to be avoided. The use of unique local opportunities is illustrated with examples from Canada and McMaster University. In the author's experience outcome evaluation is likely to raise as many questions as it answers, and it may lead to new questions that are more focused and refined.

Decisions made in the late 1960s and early 1970s to expand the medical school capacity in many countries provided a unique opportunity for innovation in medical education (Richards et al., 1989; Kantrowitz et al., 1987). Innovative programmes were begun in such diverse settings as Beersheva in Israel, McMaster in Canada, and Newcastle in Australia. These innovations were often centred on incorporating newer educational approaches into the curriculum and attempting to make medical education more responsive to perceived societal needs. As a result, the admissions requirements were often expanded for medicine to allow greater diversity in the student body, problem-oriented, small group learning was used, or more of the education was carried out in community settings. Yet, because these innovations were embedded in different cultural contexts, innovation also developed in unique ways. Differences were shaped, in part, by the existing traditions in medical education and health care delivery in those countries and by the most pressing

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* When a doctor has completed his formal education and practises without supersivion.

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issues in how physicians are selected, educated and eventually practise in their countries. Thus, each programme is a product of both international forces and forces in its own country.

In the past decade, these schools have reached the point in their history where sufficient numbers of graduates have entered practice to ask questions about the impact of these physicians on organised medicine and medical care delivery in their countries. One general question of interest is what similarities and differences exist in the outcomes of innovative medical education programmes. However, while this general question appears deceptively simple, in practice such outcome evaluation is exceedingly complex and difficult. Specific questions must be framed which obtain answers that are of interest to decision-makers. The methods used in the evaluation must be credible. Further, engaging in outcome evaluation may not be worthwhile in some settings if the costs involved are likely to exceed the value of the information obtained.

What Questions should be Addressed?

Several generic criteria can be used to help to focus an evaluation exercise. Clearly, it is important to focus on questions that will advance our understanding of the impact of these innovations in medical education. The answers we receive should inform the decision-making process. If no actions will be taken (even the decision to maintain the *status quo*) by the answers we receive, the question is not worth asking. Careful thought must also be given to whether the answers can be obtained in a timely fashion. If the answers are delayed to such a point that they are no longer considered relevant (because of changes introduced during the intervening time), they cannot inform decision-making. Similarly, finite resources are usually available for evaluative research. Choosing to answer some question involves opportunity costs. Other questions, or even other ways in which the money could have been spent aside from outcomes research, are foregone. The perceived potential cost of not obtaining the information may also be considered. Often, the exercise becomes one of deciding which of several interesting questions is most worthy of pursuing, given the existing resource constraints.

The outcomes of interest must be measurable in practice. Practical ways to operationalise the constructs of interest must exist that are precise and accurate. Global constructs, such as "good physicians" must be broken down into specific, measurable attributes and behaviours, if measurement is to be attempted. Further attempts at operational definition may reveal that little consensus exists for such definition, because such global constructs as producing "good physicians" or physicians "responsive to societal needs" were often used to appeal to a wide range of potential audiences at the initial stages of securing support for the innovation.

Questions concerned with outcomes should focus on effects which are hypothesized to be fairly large and are likely to have endured over time. Intervening events (e.g. postgraduate education), constraints imposed by existing structures for medical care delivery, and the societal context in which care is delivered should not be able to wipe out the intended effect. Several studies have shown that effects of an educational proramme, observed shortly after it took place early in medical education, may not last even through the final years of the curriculum (Engler et al., 1981). Further, if the length of postgraduate education is similar or even exceeds the length of medical school education (as often occurs in North America), the type, length and location of postgraduate education may constitute important confounding variables in outcome evaluation. If this is suspected, these factors should also be measured as part of the study design.

The existing health care delivery system, particularly the financial reward system for physicians, and the context in which medicine is practised may exert a profound influence on how physicians behave. Thus, the likehood of observing outcomes of interest may also be muted by the values and rewards encountered in practice. For example, in North America, it may be exceedingly difficult for physicians to resist ordering unnecessary or marginally necessary laboratory tests, when the practise climate emphasizes defensive medicine and the judicial system awards large judgements based on lack of exhaustiveness of testing rather than lack of application of reasonable clinical judgement (Woodward & Rosser,1990). In some developing countries, the financial incentives given to specialty practise in urban areas may impair the ability of community-based programmes to produce primary care physicians willing to serve in less well-equipped settings and less well-paid positions in geographically isolated rural areas. The demonstration of such problems, and particularly, the effects of interventions to overcome them, may be as important as demonstrating that some medical education interventions have an enduring effect. However, such studies shift our focus away from the enduring aspects of medical education to address reasons why effects of medical education do not endure.

What Kinds of Outcomes of Medical Education are Likely to Endure and be Observable during the Practice Period?

At a recent conference, sponsored by the Josiah Macy Jr. Foundation, we tried to identify possible important differences in the outcomes of problem-based and/or community-oriented innovations in medical education which may endure (Friedman et al., 1990*). Unfortunately, participants were medical education researchers from North America only. Our limited experience with innovative programmes in other parts of the world may have produced some bias in our assessment. However, with this *caveat* in mind, the group made several specific recommendations about evaluations of outcomes seen as important and likely to endure. Three outcomes, seen as measurable during the practice period, were differences in 1) psychosocial and interpersonal skills; 2) satisfaction (with medical education and career); and 3) continued learning. The latter outcome was not seen as measurable until the physician had been in practise five or more years, while the former

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outcomes were seen as measurable both at earlier points in time and during the practice period.
The group came to recognise that clinical problem-solving was not likely to be an area where differences between innovative and traditional medical curricula would emerge during the practice period. This was debated within the group at some length. Eventually, we decided that the effects of subsequent education (during clerkship and the post-graduate period) were likely to attenuate any early advantage achieved by problem-based curricula. Further, the construct was seen as not likely to be measurable in practice, given that the range and complexity of problems that are seen during that period is often dependent on the field of medicine which is chosen by the individual doctor. Performance in problem-solving may be content specific (Norman, 1986). By the time physicians entered practise, generic problems are likely to be too simple (suffer from ceiling effects) and inappropriate. Further decisions about the types of problems used might influence the results, because only a very limited number of problems would be likely to be feasible.

No attention was paid to the choice of specialty, to location of practise or to other aspects of practise behaviour, although these may also be seen as legitimate, enduring outcomes of some innovative schools. For example, the University of New Mexico's alternative track of medical education has a specific objective to increase the number of physicians choosing primary care careers (Kaufman, 1989). Community-based schools in particular may seek to influence the mix and locations of their graduates (Richards et al., 1989; Kantrowitz et al., 1987). However, powerful discentives may operate in the way the health care delivery system is organised. Yet, differences in decisions about field and type of practice may reflect important differences in the outcomes of medical education.

With whom should the Graduates be Compared?

The choice of a comparison group or groups may seem to be a simple decision. Glibly put, we are looking for "contemporaries" or "peers" who also went to medical school but did not experience innovation. For medical schools that developed innovative, parallel 'tracks' or had a traditional programme before the innovation began, internal comparison groups may possibly exist. Unless selection into the parallel curriculum was random, use of contemporaries from the traditional track of the same school may be subject to selection biases. Contamination may also have occurred (e.g. the comparison group was exposed to many elements of the new curriculum). Use of previous graduates also has some problems. If differences are seen, they may be unrelated to the curriculum and simply reflect time trends. If no differences were seen, it is possible that contamination occurred. For these reasons, neither of these internal comparisons are likely to contribute to designs that provide strong evidence about the impact of innovations, unless students were randomly allocated to participate in an alternative curriculum and the traditional curriculum.

Graduates of other medical schools, while somewhat more difficult to identify and recruit, are likely to be a better choice for comparison purposes. Again, "peer" may not be completely obvious. Is the external comparison simply someone who graduated at the same time? Should graduates of one or more medical schools be included as the comparison group? This type of comparison may be appropriate for an examination whether or not differences in basic choices (field, length of training and location) have occurred. Yet, caution must be used even here. In North America, such basic choices are known to be influenced by sex of physician and the age of the physician at graduation (David et al., 1990). Thus, when comparing McMaster graduates with their contemporaries on these dimensions, we chose two comparison groups, one matched only for graduation year and one where the McMaster graduates were matched by age and sex as well as year of graduation (Ferrier et al., 1987).

Practice behaviours of interest (e.g. attention given to patient education) may be influenced by basic career choices. When measuring behaviour in practice, "peers" are more likely to be physicians who practise in the same field of medicine. Yet, length of time in practice, sex of physician, location and type of practice are also likely to influence practice behaviour (Eisenberg, 1985). Thus, in structuring comparison groups, these factors should be considered (potential matching variables). If the sampling frame to be used contains no information about these factors, efforts must be made to obtain information to evaluate these possible confounding variables.

Using Unique Local Opportunities

Both decisions on what to evaluate in outcomes research and how to evaluate it are likely to be heavily influenced by the opportunities that are available in the setting in which outcome evaluation occurs. Certainly, this has been the case in the author's own studies of the outcomes of medical education at McMaster (Woodward, 1984, Woodward, 1989). The availability of good sampling frames and routinely collected information was a major factor in how outcome studies were designed. The ability to use such information as age, sex and year of graduation, in order to find matched comparisons, reduced the variability in the data and made measurement of effects more precise.

A sampling frame from the Canadian Medical Association, which had carried out a national manpower survey of physicians licensed in Canada in 1983 (Woodward et al., 1985), was used to select two comparison groups for McMaster graduates (1972-1979) from English-language Canadian medical schools. The first comparison group was matched by year of graduation alone, while the other was matched by age and sex as well as year of graduation. The latter comparison group was chosen because McMaster had graduated more women, and its student body was somewhat older than at other Canadian schools. Anonymous data from the survey were used to answer such basic questions as whether McMaster graduates differ in their choice of fields of medicine and how they spend their time (Ferrier et al., 1987). We found that McMaster graduates were less likely to enter surgery and its subspecialties, and more likely to enter internal medicine and its subspecialties than other Canadian English-language graduates but equally likely to specialise or chose a primary care (general and family practice) career. Among primary care physicians, McMaster graduates were more likely to obtain certification from the College of Family Physicians of Canada than their contemporaries. McMaster graduates also differed in that they were more likely to report involvement in research, education and administration as part of their practice, and to hold academic posts than their peers. These differences were observed whether one or both comparison groups were considered.

In another study (Woodward et al., 1990), the sampling frame was the Ontario Ministry of Health's file of primary care physicians who billed the Ministry for their services during the 1986 calendar year. The sampling frame for this study included about one-third of the output of both McMaster and other Ontario medical schools during 1972-1983. Here anonymous data on all McMaster fee-for-service primary care physicians were obtained along with a comparison group of graduates of other Ontario medical schools who were matched to the McMaster graduates by sex, location and year of graduation. Data on certification status had been obtained from the College of Family Physicians and were added to the file by the Ministry of Health. Separate information on hours worked during 1986 was obtained from the Canadian Medical Association which had completed another manpower survey of Canadian licensed physicians in 1986 (Adams, 1989). These data could not be directly added to the file.

McMaster graduates in general and family medicine, while working similar hours to those of the comparison physicians, saw fewer patients, provided fewer services and earned less under the fee for service system and had a somewhat different pattern of practise (Woodward et al., 1990). They were less inclined to work in an emergency room and do minor assessments (brief, involving only one organ system or problem) while they were more likely to offer prenatal care and psychotherapy to their patients.

Serendipity also can occur. During the selection of a matched sample (by year of graduation, sex and location) of McMaster and other Ontario general and family practise physicians from the Ontario Ministry of Health's database, we noted that McMaster graduates, who are general and family physicians in Ontario, are more likely to choose alternatives to fee-for-service funding (capitated and salaried positions) than their contemporaries who graduated from other Ontario medical schools (Woodward et al., 1990). This finding was interesting, because the Ontario government is actively promoting alternatives to fee-for-service medicine. It feels that fee-for-service practice rewards the number of specific services billed for a patient and the number of patients seen more than the extent to which the physician carefully attends to the health care needs of the individual patient.

Using secondary sources of data ensures that the sample will not be biased through limited participation by one or both groups. Yet, by not obtaining information directly from physicians or their patients, only those aspects of practise about which data are collected can be studied. We can somewhat augment such files by acquiring data from several secondary sources (e.g. regarding certification and hours worked). But, whether the differing patterns of practice we observed are related to differences in quality of care cannot be answered with such data.

A proposal to examine quality of care was developed at McMaster over ten years ago but not funded. The cost was deemed too high for a study to show, as one reviewer put it, "that McMaster graduates are safe; we already know that". Patient satisfaction, extent of agreement between doctor and patient regarding what had been communicated about selected problems, practice audit of selected indicator medical conditions, use of selected drugs and drug combinations, and the use of standardised patients to assess interpersonal, clinical and management skills were some of the measures proposed at that time.

In the intervening years, we have developed more precise information about differences and lack thereof between McMaster graduates and their contemporaries that would allow refinement in study design. For example, we have shown that McMaster graduates in general and family medicine are more likely to seek certification by the College of Family Physicians (Ferrier et al., 1987; Woodward et al., 1990) and are more likely to include teaching activities during their practise. Certification in family medicine among Ontario physicians has been shown to be linked with higher quality of care in a recent study by Borgiel and his colleagues (Borgiel et al., 1989). This pioneering study developed a sophisticated approach to quality of care assessment in primary care. Their strategy for recruiting randomly selected physicians to participate in the study involved personal contacts by opinion leaders in the physician's home community and led to high agreement to participate among the physicians to be sampled. A quality of care study involving McMaster graduates would need to ask whether the differences, if present, are observed generally or can be explained by the increased likelihood of certification or involvement in education among our graduates.

Good descriptive information about how graduates differ from, and are similar to those of other schools, is important to study design. For example, we have chosen to focus on primary care physicians because they are the largest group of graduates and because no difference was observed in the proportion of McMaster and other contemporary graduates in the proportion choosing primary care (Ferrier et al., 1987). If far fewer or many more McMaster graduates had chosen to enter primary care than their peers, we would be concerned about differential selection confounding our groups. Primary care physicians are more likely to remain in Ontario than those entering specialties. Mobility of graduates also makes it more difficult to study them. Knowledge about the patterns of dispersion of graduates can be important to study design.

Availability of measurement tools may also create research opportunities. One of our colleagues, Brian Haynes, and a medical student, John Shin, recently undertook a study of continuing learning by McMaster graduates in primary care in Ontario (compared to University of Toronto graduates). The management of hypertension (Shin et al., 1991), a field of practise where significant changes in recommended management have occurred over the past fifteen years, was the focus of the measurement tool used. They found that McMaster graduates correctly answered more questions about the current preferred management of hypertension than University of Toronto graduates. A high response rate was achieved in both groups (80%). Physicians were invited to participate by a letter from the deans of both medical schools and intensive follow-up efforts were made to enhance participation. The measure used had been designed for use in a randomised controlled trial which assessed knowledge about hypertension in community physicians exposed and not exposed to an educational intervention during practice (Evans et al., 1984). It was checked and updated using the recommendations of the Canadian Hypertension Society. Thus, the first study of the impact of McMaster on the continuing learning by its graduates (Shin et al., 1991) used an opportunity available locally - a measure that had already been developed for another purpose and one that needed only minor updating. Because a faculty member was able to interest a medical student in collaborating on the project, it became a research experience for the student, and study costs were reduced.

This pioneering study suggests that McMaster graduates may be more effective in continuing learning during practice than graduates from a traditional medical curriculum. However, it is possible that the same difference may not be observed for other topic areas. Our Faculty has long had a major research interest in the management of hypertension, and this may have contributed to the effect observed for this topic. Only a series of studies demonstrating more up-to-date knowledge, across areas of medicine, would be convincing. The extent to which physicians are involved in teaching students may influence how up to date their information is. We already know that McMaster graduates are more likely to be involved in medical education and, among those who are involved, spend more hours teaching per week (Ferrier et al., 1987). Thus, future studies are likely to ask more refined questions. It becomes important to know whether any effect observed is an indirect effect (a function of the higher involvement in education among McMaster graduates) or is a direct effect (observed among McMaster graduates generally, after controlling for their increased likelihood to teach).

Unique opportunities are likely to exist in other countries to answer some questions regarding innovations in medical education. For example, we cannot unravel selection from curriculum effects when assessing the impact of the educational intervention at McMaster (Woodward, 1984). Both the selection process and curriculum differ from other medical schools in Ontario. Further, the selection process is designed to identify learners who will do well in our curriculum. However, selection of medical students in The Netherlands occurs by lottery among those who are eligible (Verwijnen et al., 1989). This allows the Univeristy of Limburg at Maastricht to examine the effects of curriculum alone. Newcastle in Australia also has a unique opportunity to examine whether selection, curriculum or both contribute to outcomes. Half of their medical class is selected solely on the basis of their past academic record, while the remainder are chosen by applying carefully defined criteria related to academic, intellectual and personal attributes (Maddison, 1989).

Conclusion

Assessment of outcomes of innovative medical schools among practising physicians requires that we examine skills, behaviours and attitudes that can be expected to be long lasting and will be of interest to decision-makers. Such outcome assessments should focus on effects that can be measured in a timely fashion and are large enough to be observed, given the precision and accuracy of existing measurement tools. The possible confounding effects of intervening and concurrent experiences must be considered.

Types of outcome evaluation that can be carried out depend on the ingenuity and imagination of the local research groups in exploiting the unique opportunities available in their setting and the way they handle constraints. Constraints on outcome evaluation may include the lack of availability of sufficient financial and human resources, lack of national or regional information about physicians and their practices, and absence of measurement tools for the outcomes of interest. The willingness of graduates, and those with whom they are to be compared, to participate may also act as a constraint. Mobility of graduates may also serve as a constraint, as those who reside outside the area or country are more difficult to include in studies. Increased sophistication in the assessment of quality of care makes this type of measurement more feasible, if this is seen to be an important outcome of the innovation. Study design may be refined by the availability of sampling frames which allow selection of graduates for comparison who are matched for potential confounders.

In our experience, outcome assessment is likely to raise as many questions as it answers and may lead to new questions that are more focused and refined.

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Comparing Problem-Based with Conventional Education: A Review of the University of Limburg Medical School Experiment

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Abstract

Findings from a continuing programme of evaluation research at the University of Limburg are presented. The research programme aims to clarify to what extent problem-based learning is an effective and efficient approach to medical education and if so: Why. The data gathered over the years suggest that there is no particular reason to believe that problem-based curricula provide inferior training to medical students as compared with conventional curricula. Medical students in a problem-based curriculum do not spend less time on their study, and their achievement is comparable to that of students of traditional schools. Problem-based curricula do appear to provide a friendlier and more inviting educational climate, which, in turn, creates a comparatively lower dropout rate. There is some evidence now that students in a problem-based curriculum integrate knowledge from different domains better and acquire superior reasoning skills, than students in conventional curricula.

This paper reviews findings from a continuing programme of evaluation research carried out at the University of Limburg. The research programme attempts to clarify to what extent problem-based learning is an effective and efficient approach to medical education and if so: Why. We present data on medical students' attitudes toward instruction, student achievement in terms of test scores measuring medical knowledge, and problem-solving capabilities acquired by students. Comparative data on duration of study, dropout rates, and study load are also presented.

In this discussion, we capitalise on a unique aspect of the Dutch medical student selection system: the lottery. This process allocates students by chance not merit or other considerations to various medical schools after baseline requirements have been met. The student bodies of the medical schools in The Netherlands are thereby more similar than is typically the case in the rest of Europe or in the United States. This is a boon for comparative evaluation research of the kind reported here. However, as selection of the students in the studies present is not always entirely random, the comparisons - although scientifically justified - need to be interpreted with some caution.

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Brief Overview of the Medical Curriculum at the University of Limburg

The Maastricht medical curriculum is a 6-year programme. The first 4 years are devoted to understanding pathophysiologic mechanisms underlying disease and the final 2 years are focused on clinical training. Each year of the curriculum consists of a number of 6-week "blocks" or units. During each unit, students meet twice a week for a two-hour, small-group tutorial in which problems are analysed and learning goals are formulated. These groups are guided by tutors drawn from the staff whose role it is to facilitate the learning process of the students (Barrows and Tamblyn, 1980). Each unit includes a skill-training programme in which students are taught diagnostic and therapeutic skills. Their newly acquired diagnostic skills are tested in encounters with subjects who simulate patients.

In each year, the units are organised around one central theme. In the first year, the various ways in which the human body adapts to the environment are the focus of study, featuring units on metabolism, response to infection, regulatory mechanisms and homeostasis. The second year considers human functions as perception and locomotion and deal with development issues like growth and differentiation. For the third and fourth years, the Faculty has chosen health problems that are crucial in terms of prevalence and severity in Dutch society. Problems such as pain in the chest, fatigue, and blood loss comprise the themes of the units. Electives for a variety of research and clinical experiences may also be chosen as part of the curriculum.

The curriculum components - problem-based learning, small-group tutorials, and emphasis on self-study - distinguish the University of Limburg medical curriculum from the traditional Dutch medical schools with which it is here compared.

Review of Outcomes

Student Attitudes toward Instruction

In a study carried out in Groningen (Bender, 1979) students were asked to write a letter answering the following question: "What do you think of your instruction?" The letters showed one general trend. These medical students had generally experienced their instruction as boring, irrelevant, and sometimes anxiety provoking. Of course, there were exceptions; individual teachers or programmes were genuinely enjoyed and contributed to the students' motivation to become doctors. However, in general their medical education had not appeared to be an enriching experience. Schmidt and Moust (1981) replicated Bender's study. They randomly selected 50 students from the Maastricht problem-based curriculum, 10 from each class[1], and asked them to write a similar letter about their experiences. Ninety-two percent of the students responded. The authors extracted positive and negative evaluative remarks from the letters, coded the answers in a number of categories, and tallied frequencies. They scored 147 evaluative comments by the Maastricht medical students on aspects of their curriculum. Of these, 117 were positive, indicating that the Maastricht medical students had a largely positive attitude toward their curriculum.

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[1] At that time only five classes were available for study.

A closer look at the student responses is instructive. For example, the tutorial groups in addition to being praised could also be a source of discontent. One student wrote:
"During tutorial groups students behave rather disinterestedly or do not react at all. If the tutorial does not work the way it should or if a group doesn't click they merely shrug their shoulders, even though the tutorial group is the key to the entire study. Your relationship with people is what it is all about, now and in the future. And if that is not feasible (not even in a tutorial group) then what is? One of my characteristics is that I feel very dependent on others to maintain my motivation. In this self-directing approach, the others are my stimulus."

One of the more interesting findings was that first-year students expressed difficulties with self-directed learning. They seemed to need at least 6 months to adapt to this new learning environment in which they are responsible for what they study and how they study. One of them wrote:
"As we are unfamiliar with a self-directed study programme we are confronted with a totally new educational system in the first year. This is strange: because we have to discover how to study by ourselves: no certainties; hardly any guidelines, but after a year's hard work it turns out to be less difficult."

Opportunities for gaining acceptance within the medical care system and patient care were most frequently rated positively. The conclusion should be drawn that early and frequent involvement of medical students with a health care provider is of developmental importance This is particularly so as a source of motivation. One student wrote:
"I gained most insights into my studies during my electives with physicians and in the hospital. Only then did I realize how little I knew. After each of these rotations I experienced a considerable increase in my study activities. For me, the confrontation with practice is a very important and positive asset in the curriculum of the Maastricht Medical Faculty. Because of this practice you get a very good - be it a rather broad - insight into the health care system. It gives you a good impression of what you are studying."

These representative qualitative descriptions provide a candid and generally positive reaction to the Maastricht curriculum by a random sample of students.

Study Load

In investigating study load, Weggeman and Moen (1982) adopted a skeptical point of view - they asked whether the positive student attitude, expressed in the Schmidt and Moust study, was merely an indication that students were satisfied with the Maastricht curriculum because it did not demand too much academic effort. Weggeman and Moen asked: "Does an emphasis on independent learning with a de-emphasis on summative assessment merely produce easygoing students"? To explore this question, they used a comparative approach and surveyed the study load of first and fourth year Maastricht medical students during a randomly selected week of their respective programme. The authors then compared the study load estimates with those from various other Dutch university curricula. They found an average study load per week of 34.5 hours for first year students and 39.3 hours per week for fourth year students at Maastricht. Students in five natural science oriented programmes, ranging from biology to medicine, at other universities in The Netherlands spent on the average 27.8 hours a week on their study. The results of this comparison indicate that there is no reason to suppose that emphasis on independent learning and absence of pressure from summative examinations create a learning environment that breeds students who put less effort into their studies.

Years of Study and Dropouts

Post, De Graaff and Drop (1986) investigated the relative efficiency of the Maastricht curriculum in terms of producing graduates and limiting dropouts. These are important data, as the mean dropout rate at Dutch universities in the early 1980s was no less than 52%. Duration of study and dropout rate of the first five classes at Maastricht were compared with statistics from other Dutch medical schools. The results clearly demonstrated that the efficiency of the Maastricht medical school exceeded that of the other Dutch medical schools. The majority of the Maastricht students graduated within 6 and a half years. Median study duration at the other medical schools ranged from 7 to over 8 years. The percentage of students who graduated of was 85% for Maastricht and ranged from 64% to 71% for the other medical schools. The Maastricht curriculum thus produced relatively more graduates in less time. As there has been no differential entrance selection of students to the various medical schools, the most likely explanation for the higher efficiency of the Maastricht curriculum would appear to be the motivating effect of problem-based learning.

Achievement

The dropout rates are described in a positive light as an achievement of the medical curriculum. However, when the data are viewed from a more critical perspective, the Maastricht medical

curriculum could perhaps graduate students who might not have succeeded in other schools. To answer this question, Bender from the University of Groningen, and his associates from several other medical schools (1984) asked: "To what extent is performance of students in the domain of medical knowledge in a problem based curriculum comparable with that of students in a traditional school?" The investigators compared the achievement of the Maastricht medical student with that of students in two traditional medical curricula and a reference group of graduates from various medical schools. For each group in the comparison, all levels of medical expertise were represented and all groups from first year to the sixth year took the same test. The test administered consisted of 200 items, a random sample from a large item bank covering medical knowledge as a whole: Clinical, biomedical and behavioural. The main conclusion drawn by Bender et al (1984) was that, whatever the differences, they were small and insignificant at all levels of expertise. Their findings, then, do not support the assertion that lower dropout rates are associated with poorer performance and less critical scrutiny by the medical school at Maastricht.

Integration of Knowledge and Clinical Reasoning

Integration of knowledge is an important topic in advanced learning. Flexible application in solving difficult problems can only be expected when knowledge bases are integrated. Problem-based curricula, while focusing on the application of "old" knowledge in new situations, are said to encourage the integration of knowledge from different domains (e.g. biomedical and clinical knowledge), while traditional curricula seem to assume that integration occurs automatically.

In order to investigate the effects of type of curriculum on integration of knowledge, Boshuizen and Schmidt (1990) compared the perfomances of students from two medical schools, one problem-based and one conventional. These (preclinical) students were asked to explain how a specific metabolic deficiency could be related with a specific disease. Knowledge of biochemistry and internal medicine had to be integrated and applied. In addition to these students, two groups of experts, biochemists and internists, were incorporated in the study. Students from the problem-based curriculum and the biochemists appeared to take an analytical approach to the problem by first exploring the biochemical aspects of the problem, and subsequently linking them to clinical aspects. Students in the conventional curriculum and internists tended toward a more memory-based approach. They searched their memories in order to find a direct answer to the question. This latter strategy, however, resulted significantly less accurate responses and more frequent failures by the students in the conventional programme. These results suggest that students in a problem based curriculum integrate their knowledge better with resultant more accurate reasoning than students in a traditional curriculum. Whether better integration and more accurate reasoning translate into better diagnostic hypotheses remains to be explored.

Conclusion

The studies presented here have presented global comparisons of curricula at Dutch universities The studies are suggestive, but their quasi-experimental nature does not allow us to conclude that the differences are purely the result of differences in the curricula. The studies were outcome-orientated and all were at some risk of being unduly influenced by shortcomings of sampling. However, all the studies dealt with core issues of the discussion whether problem-based learning and related innovations really provide a viable alternative to conventional education. These issues included performance in achievement tests, clinical reasoning, efficiency and effectivity of problem-based programmes, time spent on study, and attitudes toward instruction. The data suggest that there is no particular reason to believe that problem-based curricula provide inferior training for medical students as compared with conventional curricula. The data in this paper clearly demonstrate some "bottom-line" results: medical students in a problem-based curriculum do not spend less time on their studies, and their achievement is comparable to that of students of traditional schools. Furthermore, problem-based curricula do appear to provide a friendlier and more inviting educational climate; the response of students in their evaluation of instruction clearly demonstrated this influence. Such an educational climate facilitates the emergence of positive attitudes toward study and may be responsible for the lower dropout rate. There is also some evidence that students in a problem-based curriculum integrate knowledge from different domains better and acquire superior reasoning skills. Finally, there is growing evidence that problem-based learning approaches and problem analysis in a small-group tutorial may be an effective facilitator of the processing and retention of new information (Schmidt, De Volder, De Grave, Moust, & Patel, 1989).

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Introspection at the Faculty of Medicine of the University of Limburg

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Abstract

The Faculty of Medicine of the University of Limburg in Maastricht has implemented problem-based learning from its inception in 1974. On the occasion of a visitation by a National Review Committee in 1991, the Faculty had to prepare a self-study. Among other data, that report contained a survey of the Faculty's strenghts and weaknesses. The most important of these are reviewed together with the remedies that are planned to correct the defects.

Introduction

In response to a request by the Ministry of Education of the Netherlands, the Dutch Society of Collaborating Universities (VSNU) has organised a series of site visits to universities since 1991 in order to assess the quality of their faculties' education. Among the first to be visited were the Faculties of Medicine and Health Sciences. Each school was requested to prepare a 'self-study', in order to provide advance information for the external review committee. The present paper describes the current Maastricht curriculum, and more specifically some of its strenghts and weaknesses as identified in the self-study. The flaws will be discussed with the remedies that have been planned to correct them.

Educational starting points and curriculum design

The educational philosophy for the Faculty was originally laid down in a paper published in 1972. The major elements, which were distinct from those applied by the other Dutch schools at that time, were:

- student-centred, self-directed learning,
- multidisciplinary education,
- early introduction of students to health care settings,
- equal attention to extra- and intramural health care in the curriculum
- attention to the development of skills and attitudes, and
- emphasis on formative rather than summative assessment.

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These starting points are still valid in the Faculty and some of them have even been adopted by some of the other Dutch medical schools.

To implement the philosophy the Faculty introduced from its very inception problem-based learning and small group tutorials as the main educational setting for the first phase of its curriculum (Years 1-4). Each year is divided into 6-week multidisciplinary educational units or 'blocks'. The emphasis in these blocks shifts from basic sciences in Years 1 and 2, and normal human development in Year 2, to major categories of complaints as encountered in General Practice in Years 3 and 4 (Table I). A training programme for diagnostic, therapeutic, laboratory and communication skills runs throughout this phase of the curriculum (Van Dalen, 1990). Introductions to health care settings commence as early as Year 1. Each block ends with a formative block test. The students' progress is assessed four times in each year, when all students sit a summative test at the level of a Final Examination called the Progress Test (Van der Vleuten & Verwijnen, 1990). In the last phase of the curriculum (Years 5-6) the students undertake clerkships in various hospital departments, in general practices and in ambulatory, clinical, and mental health care settings. Starting in Year 2 students are offered electives; in total these amount to almost one year in the six year curriculum.

Organisation of Education

The departure from a curriculum that is organised by departments caused the responsibility for the educational programme to shift to the central Faculty level (Bouhuijs, 1990). An outline of this central organisational structure is presented in Table II. In addition to this core organisation there are quite a number of *ad hoc* committees to address current issues. For instance, a committee for the management of the renewal of the first phase curriculum has been in operation for several years. These *ad hoc* committees usually report to the Education Committee.

Does Bureaucracy Fossilise the Faculty?

Even a first glame the organisation of education (Table II) may give the impression of a cumbersome bureaucracy. Clearly, it is not possible, in a structure of this nature, for a new idea to become incorporated into the curriculum within a matter of a week or two. To cite an example, a major decision to restructure the curriculum took some four years of in-depth discussion before the change was implemented (Maicor, 1990).

Although this tsructure may constitute a drawback, in that such a centralised organisation inhibits fast response, the structure guarantees democratic decision-making and a fair chance for students to have an input into the programme. This extensive organogramme and the number of academics involved are sometimes used to demonstrate how expensive the Maastricht School must be, when compared with other Medical Faculties. However, Table I.Organisation of education at the Faculty of Medicine

Decisions on general outlines	Faculty Council (8 staff, 4 students)
General management	Faculty Board, Vice-Dean for Education
Strategic management & Quality assessment	Education Committee Elected; 6 staff, 6 students Vice-Dean for Education (advisor) Head Education Office (advisor)]
Operational management	Coordinating Committee of Education: Chairperson plus: Chairperson Education Committee Year Coordinators (5) Head Skills Laboratory Chairperson Project Group Electives Students (2) Vice-Dean for Educ. (advisor) Head Education Office (advisor)
Curriculum implementation	
A. Educational units (blocks,clerkships)	Year Planning Groups for Years 1,2,3,4, and 5/6; each consisting of the Year Coordinator plus all Block Coordinators for that year
	Block Planning Groups Block coordinator plus 4 staff members and 1-2 students
	Tutors
B. Curriculum support	Project Groups for: Skills Training Practical Medical Training Attitude Development Student Assessment Learning Resources Faculty Development Programme Evaluation
C. Student Assessment	Standing Committee for the Examinations (tenured academics)
	Executive Committee for the Examinations

these antagonists tend to forget that the individual departments in traditional schools also spend time and energy on organising their educational activities. Quite apart from any argument of cost, department-linked organisations are not likely to meet the quality of management attained by this organisational structure for a Faculty as a whole. Another potential complication, common to expanding organisations, rests in the allocation of tasks and power - in its worst manifestation known as nepotism. At the inception of the school, almost all academics held positions in the educational organisation, but as the staff expanded there was a tendency to avoid the appointment of newcomers to central roles. This was taken for granted by many, until the Faculty adopted a list of educational activities that a member of the academic staff should have fulfilled in order to be eligible for promotion. Shortly thereafter discussions on the reform of the curriculum commenced, and this opportunity was taken to involve many of the new staff.

Are All Academics Equally Motivated Towards PBL?

When the School was established in 1974, such a plethora of tasks had to be fulfilled by so few, that individuals had hardly time even to reflect on their motivation. However, as the Faculty expanded and the curriculum had largely settled down, there were quite a number of staff members who saw education as a rather boring assignment. In their view, there was hardly any room for individual initiative in the curriculum. Few lectures and practicals were permitted, and tutors were supposed merely to guide the group process but not to participate in the students' discussion on the basis of their expertise (Moust et al., 1990). Moreover, being a tutor twice a week for two hours over a six week period was felt to interfere heavily with other commitments that yielded better career prospects, like research and health service.

As mentioned earlier, these complaints were alleviated to some extent by the involvement of many staff members in the construction and implementation of the new curriculum (Snellen-Balendong, 1990). Furthermore, the concept of the tutor acting strictly as a facilitator of the group process was complemented with a role for the tutor as a challenger of the student's understanding of the topic in hand. Consequently, departments pertinent to the content of a block were identified. Usually, about five departments would be acknowledged as "core departments", crucial to the content of a particular block, and another four departments as "peripheral". The block coordinator and the planning group members were appointed in a revolving fashion from the core departments; tutors were recruited exclusively from the core and peripheral departments. This strengthening of the linkage of blocks with departments in relation to the content of the block has also facilitated the contribution of these departments to the construction of block tests.

The Faculty Council recently adopted a further measure to promote extrinsic staff motivation for education, the review of the evaluation of tutors' function by the students. Although standard evaluation forms, to be completed by the students at the end of each

Table 1. Curriculum of the Maastricht Medical School, 1991/1992

Year 1	INTRO	Introduction to medical studies 1.1	Metabolism 1.2	Interaction and regulation 1.3	Attack and defense 1.4	Balance / imbalance 1.5	Care for health 1.6
Year 2	Perception, consciousness and emotion 2.1	Locomotion 2.2	(Electives) 2.3	Fundamentals of scientific research* 2.4	Growth and differentiation 2.5	Born and raised 2.6	Ageing 2.7
Year 3	Shortness of breath and chest pain 3.1	Inabilities 3.2	Mental and behavioural problems 3.3	Appearance and external manifestations of disease* 3.4	Pain 3.5	(Electives) 3.6	(Electives) 3.7
Year 4	Problems of reproduction and sexuality 4.1	Abdominal complaints 4.2	Fever, infections and inflammation 4.3	(Electives) 4.4	Blood loss 4.5	Fatigue and weight loss 4.6	Emergencies* 4.7

* instead of 6 weeks, these units are 4 weeks in length

block, had for many years contained 10 questions on the performance of the tutor, the impact of this part of the evaluation had been quite small (Gijselaers, 1990). For example, a tutor, who had been formally registered for a given block by the Office of Education, might actually have sent one or several substitutes on a number of occasions. It would then be no longer clear to whom the students comments referred. The data on the performance of tutors were handled confidentially by the Office for Education; they were usually transmitted merely to the tutor and stored by the Office. Only in cases of extreme dysfunction would the block coordinator and the Coordinating Committee call the tutor to account. The new regulations identify the tutor by name. Evaluation data will be made public, and repeated malfunction will be dealt with through discussion with the bodies responsible for the implementation of the curriculum and remedial tutor training. Satisfactory performance as a tutor will lead to other roles in the organisation of the curriculum: these are mandatory for progress to a tenured academic career. Those tutors who consistently perform satisfactorily will regularly be given a small token of appreciation. To further strengthen the tutor's role, the Faculty is now reviewing the issue whether tutors should also judge the students' performance in the tutorial group (see also below).

Are all Students doing Well in PBL?

The Dutch government system for the allocation of students to the Faculties of Medicine excludes selection by individual schools. New students, therefore, exhibit a broad spectrum of affinities for the Maastricht educational approach. At the negative end there are students who were allocated to Maastricht, although they would have preferred to go to a traditional school. Even so, almost all students started the first Year with great enthusiasm, but the earliest signs of decreasing motivation began to show in the last block of the first Year. Students were given their results on the last summative progress test early in that block, and, in the perception of many, the holidays seemed to commence the moment they knew that they had passed the first Year, although the block continued for several more weeks. On the whole, student attendance in tutorial groups in the first phase of the curriculum has represented a problem. Attempts were made to reduce this problem by making attendance at tutorial groups mandatory. However, this had to be dropped eventually for legal reasons. The present strategy is to try to improve the quality of the tutorial group sessions. One element of this strategy is to control the quality of the block book (which includes the problems to be studied together with lists of the associated resources). Block books for the new curriculum were reviewed by a panel of experienced members of the Faculty. Data, derived from evaluation by students and tutors were scrutinised by the Coordinating Committee. The latter also checked whether weak spots in the blocks were adjusted in response to these evaluations. Another action to improve student satisfaction with the tutorial group sessions was to pay more attention to the tutor's role. As mentioned above, the Faculty is considering the introduction of formal assessment by the group tutor, as practised for example at McMaster University Faculty of Health Sciences. Originally student assessment was not included in Maastricht tutorial group sessions, in order to avoid undesirable competition among students. Its introduction in some form, however, may be necessary to reduce the problem of low student attendance and to reinforce the role of the tutor.

Do we Need Proof of Excellence?

In earlier paragraphs, emphasis has been placed on some of the weaknesses and problems that have been identified by the Maastricht Faculty of Medicine. This might raise the impression that the School is struggling for survival. Fortunately this is not the case. Obviously, embarking on experimentation with new approaches in (medical) education represents a long road of trial and error. However, thanks to its innovative approach, the School has an outstandingly well-organised educational system. The organisational structure also makes it possible to document accurately the Faculty's manpower investment in education, and to control financial expenditure. The centralized design and marking of the examinations guarantees a consistently high quality of the tests and permits detailed feedback to the students on their strengths and weaknesses related to disciplines and organ systems. Both student assessment and programme evaluation have yielded a wealth of data, and some of this information has been used in further investigations by the Faculty's Department of Education Development and Research.

However, these organisational strengths cannot answer the question most frequently asked: "Are Maastricht graduates superior to those who were educated at the other Dutch medical schools?" It should be obvious that no clear-cut answer can be given to this question; an instant rejoinder would be: "Superior in what respect?" However, the first question has naturally intrigued the Maastricht Faculty of Medicine, and there are some data that can be cited. Four studies have been undertaken to compare the medical knowledge of Maastricht students to that of students of some of the other Dutch schools.* In all but one study no statistically significant differences were demonstrable, but all studies invariably suffered from methodological flaws which were hard to avoid. With this reservation in mind, it was concluded that, although these studies did not indicate superiority of Maastricht students in the cognitive domain, they also found no inferiority in students educated by this Faculty. Another parameter was the efficiency of the educational programme. A survey performed nine years after the start of the Maastricht curriculum provided evidence that favoured the Maastricht educational approach. Both students' mean study time and drop-out rates compared very favourably with those of the other Dutch schools (Verwijnen, 1990). Once more a warning applies to the interpretation of these data; the first classes in Maastricht consisted of only 50 students who, therefore, enjoyed a very low student-to-staff ratio. In the meantime, these figures for Maastricht and the other Dutch schools have come closer to each other, although the Maastricht figures are still among the best in The Netherlands.

Those wanting to "prove" superiority of graduates educated in innovative curricula should seriously address the question whether it is imperative to prove better performance. Let us suppose that studies like those quoted above had actually indicated an inferioriry in Maastricht students in the cognitive domain, or that the Maastricht Faculty had been less efficient in student output than the other Dutch medical schools. These, in themselves worrying, data would by no means preclude that Maastricht graduates might be better in communicating with patients, in arriving at the correct diagnosis, or in keeping abreast with new information. Although attempts to demonstrate differences between strategies in medical education should proceed, it would be wise to take into account that it may never be possible to give a definitive scientific answer to "what's best?"

Epilogue

The Faculty at Maastricht was visited by the National Review Committee in October, 1991. After it has visited all medical schools in the Netherlands the Committee is expected to publish a report on its findings; this report will appear in the Spring of 1992. However, at the conclusion of the visitation at Maastricht, the Chairman summarized the Committee's first impressions. Apart from a number of critical comments, partly referring to aspects also discussed in this paper, a comparable number of compliments was offered. The Faculty was pleased to note in one of the Chairman's final statements: "on the whole, our impression really is that education here is excellent; we are very satisfied with that". The critical points identified by the Faculty and the Review Committee are currently being addressed in order to try to effect further improvements.

Acknowledgements

The self-study (Zelfstudie 1991 Geneeskunde) was assembled from contributions by various members of the Faculty. The editorial work was performed by a committee composed of Prof. Dr. A. Nieuwenhuijzen Kruseman (Vice-Dean of Education), Prof. Dr. J.W. Arends (Education Committee), Mrs. H. Snellen-Balendong M.A. (Coordinating Committee of Education), Mrs. A. Bosch (student, Education Committee), L.F.J.Th.M. Kolle M.A. (Vice-Director of Education), M. Olivers (Education Committee), and Mrs. Ch. Schraven.

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Evaluation of Tutor Effectiveness: A Review of the Literature

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Abstract

The assessment of the performance of tutors is an essential aspect of programme evaluation in those curricula where problem-based learning (PBL) is a significant feature. However, few published evaluation tools contain categories which are specific for the evaluation of tutors in problem-based learning curricula.

A combination of search strategies was vital in this project. An extensive review of the literature identified only one article that was directly relevant to students' evaluation of tutors' effectiveness. However, personal contact with individuals working in other schools with PBL curricula resulted in additional information that was very helpful in validating the content of a new evaluation form.

Key tasks, identified for tutors, are summarised, with a brief list of references.

Introduction

Given the integral role of the tutor in small group problem-based learning (PBL), evaluation of the performance of tutors is an essential aspect of programme evaluation in curricula with a significant PBL component. Traditional tools to evaluate academics tend to measure attributes of more traditional "teaching" and contain few categories which are appropriate for the evaluation of tutors (Irby, 1983; Rippey, 1981). A number of papers do describe the roles, requisite skills, and basic attitudes of the tutor who is involved in small-group PBL (e.g., Barrows and Tamblyn, 1980; Maxwell and Wilkerson, 1990; Grand'Maison and Des Marchais, 1991). However, these neither describe forms nor report studies that evaluate the performance of such tutors.

Arising from the need for an effective tutor evaluation system in the new Occupational Therapy and Physiotherapy Programmes at McMaster University, we reexamined the tutor evaluation forms currently in use in the medical and nursing programmes, and we conducted several reviews of the literature during 1990 and 1991. These were two key steps in a current study of a new form for evaluation of tutors by students.

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Method

We realised from previous work that the number of published studies on the evaluation of small group tutors was limited. We, therefore conducted generally equivalent systematic searches forrelevant English language literature in four major CD-ROM indexes. We defined "relevant" to include literature reviews, empirically-based evaluation studies, expert opinion, and "we-are-doing-this" reports addressing the problem of how to assess the quantity and quality of teaching provided by faculty tutors in small-group, preferably problem-based, learning settings at university level.

We searched MEDLINE 1966-1991 for citations containing any variation on the word "tutor" (e.g., tutored, tutorial, tutoring, tutors) in their title or abstract and "education" of "faculty" (including their subdivisions "dental", "graduate", "medical", "nursing" and "pharmacy) but not "computer-assisted instruction" or "computers" (and their subdivisions) among major or minor MESH headings. Other strategies, including searches based on synonyms for "tutor" , were found to be unsuitable.

We then searched the Cumulative Index to Nursing and Allied Health Literature (CINAHL) 1983-1991 for citations containing any variation on the word "tutor" in their title or abstract and "faculty, nursing" or "faculty, allied health" but not "computer-assisted instruction" among their major or minor CINAHL headings. Alternative strategies, including restricting items to those containing "promotion and tenure" among their CINAHL headings proved unproductive or too restrictive.

We also searched the PsyLIT Abstracts, 1983-1991 for citations containing "college teacher" and either "personnel evaluation" or "teaching fellows" in their abstracts or any variation on "tutor" in their title, abstract, or "key phrases".

Finally, we searched the Educational Resources Information Center (ERIC), 1980-1991 for citations with ERIC descriptors "tutor" and "post-secondary education" or "higher education".

Following each search, we evaluated identified items by title, abstract and major and minor headings. We read those that seemed relevant and possibly informative. We also examined references in literature previously known to us, in order to identify books and other possibly relevant resources not identified by the above searches.

In addition to the formal review of published literature, we made personal contact with individuals working in problem-based schools in North America and known personally to members of our research group. A letter, outlining our task and our request, was sent to individuals at five medical schools. The response was very gratifying, as all but one replied. All respondents forwarded copies of the forms currently in use in their institutions, and two sent additional, relevant materials.

Results

Our searches identified over 200 articles. The majority were found using Medline (174). Thirty-two additional articles were added from CINAHL, and six from PsyLIT. No articles of value were added from ERIC. An initial screening of the articles by one of us limited the number for further review to 28. A second screening quickly reduced the number to nine, based on information in the printed abstracts. One of the problems in the search came quickly to light in reading the abstract of a paper from Leeds in the U.K. (Stanley & Wright, 1981). These authors defined "tutorial-type teaching" as "one student to one doctor". All but two of the final nine articles used "tutor" or "tutorial" in this sense.

However, these searches did yield one paper that described a form for students' evaluation of tutor effectiveness. It came from investigators in the School of Medicine at the University of Newcastle in Australia. In addition to providing an outline of the form, it also presented the results of a study using the form.

This paper, by G.I. Feletti, E. Doyle, A. Petrovec and R. Sanson-Fisher, is entitled Medical students' evaluation of tutors in a group-learning curriculum (Medical Education, 1982, 16, 319-325). Their study "focused on students' evaluation of tutors' effectiveness during an academic term, using a nineteen-item questionnaire." It took place within an integrated problem-based learning medical course. They identified four major factors in the tutors' behaviour which had "importance in the rating process: the ability to care for students, a knowledge of course structure and teaching staff philosophy, the ability to encourage independent thinking in students, and a knowledge of the specific medical problems being studied."

This paper reported many similarities to our own studies. The result of the factor analysis is one example. Based on a questionnaire of 16 items, our initial study had identified three discrete factors - which were labelled "benevolent authority", "challenger of development", and "course objectives" (Hay, 1991).

The forms and materials from PBL schools also support the importance of tutor skills that encompass these dimensions. In particular, the response from Sherbrooke was accompanied by a copy of the paper, "Validation by Network and Sherbrooke Tutors of Problem-Based Learning Tutor Tasks," presented at the Second International Symposium on PBL in Yogyakarta, Indonesia (Des Marchais and Chaput, 1990) This paper both outlined specific tasks identified for the tutor's role (based largely on work by Barrows and Schmidt) and described the process used in a face validity study of these tasks. The tasks rated as most important for tutors by designated schools in the Network were "facilitate the functioning of a small group", "favour humanism and autonomy", "manage the PBL method", and "guide the study of specific contents". Other tutor tasks were also cited, and some of these were ranked as very important in some PBL schools.

An additional paper (Gijselaers and Schmidt, 1991) was identified by an interested colleague. They describe a project that was part of a system for process evaluation of the problem-based educational programme of the Medical Faculty of the University of Limburg in Maastricht, The Netherlands. Their student evaluation questionnaire included aspects of the performance of tutors, and information is given about the results of both factor analysis and determination of interrater reliability. They conclude with a statement about the importance of a theory of teaching and learning to "posit the evaluation dimensions" in the construction of a rating scale.

Conclusion

In summary, the results of an extensive review of the literature identified only one article that was relevant to students' evaluation of tutors' effectiveness.

However, direct contact with individuals working in other schools with PBL curricula resulted in additional information that was very helpful in validating the content of our evaluation form.

This type of "multi-method" strategy to identify relevant literature may be extremely valuable in projects of this type, especially when a search of the standard literature alone contains few relevant articles.

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Evaluation of the Lecturer: The Ideal and Reality

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Abstract

This research gave us an opportunity to understand what criteria students use to evaluate their lecturers and how lecturers evaluate themselves. These criteria were compared with the "ideal" lecturer, as identified by students and teachers. Evaluation by students, and self-evaluation by teachers, and comparison with the "ideal" lecturer are not without significance for the student-teacher relationship in the educational process.

Introduction

The research involved 200 students and 200 lecturers from three medical schools in Bulgaria. One hundred fourth year students and 100 fifth year students were questioned. Students from the senior classes were addressed, because they had a long experience of their lecturers during lectures, seminars, practicals, and in the clinics.
Two hundred lecturers from the same three institutions were questioned. They were selected randomly. These teachers included lecturers (140) and associate professors (60) with experience ranging from 3 to 20 years. One hundred and thirty were clinical teachers and 70 were teachers in the basic sciences.

The aim of the research was to identify the system of values on which the criteria for evaluation of the personality of the "ideal" lecturer were based by the students and the lecturers. The investigation took place during the 1988-1989 academic year. The research was undertaken by the staff of the Paedagogical Department of the Higher Education Institute, Sofia.

Method

The questionnaire (Appendix) contained three groups of qualities, which could be possessed by the "ideal" lecturer: professional, educational and personal qualities. The respondents were asked to value these qualities on a scale for low, medium, or high. The students were asked to evaluate the qualities for an "ideal" and for their "real" lecturer. The lecturers were asked to identify the qualities of the "ideal" lecturer and to evaluate their own qualities. The specific qualities were selected on the basis of a professional evaluation and after discussions with lecturers who had participated in the course on medical education during 1986 to 1988.

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What kind of professional, teaching and personal qualities should the lecturer possess; what are the most valuable qualities of a lecturer from the point of view of the students? Where do their views differ? To what extent can the students experience and evaluate the lecturers?
The lecturers in the Higher Institutes of Medicine are involved in teaching, patient care and research. Students can gain more realistic impressions in respect of the first two, because they can observe their teachers in these activities.

Results

Professional Qualities

The criteria of the students and the lecturers were very similar for the professional qualities of the "ideal" lecturer. The opinions of the students and lecturers in respect of the "real" lecturer demonstrated considerable differences. A few students detected to a high degree the ability of their lecturers to accept "with respect the achievements of other experts". The number of students who detected to a high degree the quality of "unselfishness" in their teachers was smaller. The smallest of all was the number of students who detected to a high degree the quality of "humanism" in their lecturers. The opinion of the lecturers was rather different in terms of their self-evaluation in these three qualities. The most significant difference in the evaluations between the students and the lecturers was in terms of the criterion "dedication in the discharge of the professional duty". While self-evaluation was more favourable, the students' evaluation was more critical.

A significant difference was demonstrated in the opinions of the students and lecturers for the "real" lecturer in terms of most of the qualities. In connection with the indices for "professional knowledge, skills and habits" and "empathy", the difference between self-evaluation and the students' evaluation was significant at $P<0.05$. There was a difference at $P<0.001$ for almost all the other qualities. The students were very critical of the professional qualities of their teachers; most of the students evaluated the professional qualities of their lecturers as "low" and "medium".

The self-evaluation of the lecturers could also be characterised as critical. This was confirmed by comparing data in the evaluation of the "ideal" lecturer with self-evaluation by the lecturers. The lecturers estimated highly most of the professional qualities in the "ideal" lecturer. At the same time, they were quite self-critical and did not find these qualities to a high extent in themselves.

The students' high expectations of their teachers became apparent when comparing the results of their evaluation of the "ideal" lecturer and of their "real" lecturers. The difference was not significant only in terms of "ability to work in a health team". In terms of all the other indices, the difference was significant at $P<0.001$. A large number of the students thought that the "real" lecturer should possess to a high a degree "professional experience", but only a compartively small number of students thought that their real teachers possessed this quality to high extent. The data for "high erudition", "apply the norms of medical ethics", "humanism", "empathy", "unselfishness", were very similar to the above results.

Educational Qualities

While the criteria of the students and the lecturers for educational qualities of the "ideal" lecturers coincided closely, there was an important difference in the view of reality between the lecturers and the students. The most striking differences were in the opinions of students and lecturers related to "showing paedagogical tact", and "teaching scientific knowledge accessibly".

When the results of the lecturers' responses about the "ideal" lecturer and their self-evaluation were examined, essential differences were found. The lecturers were rather self-critical and had a low opinion of most of their own educational qualities.

It was demonstrated that 82.70% of the students valued highly the "possibility for detecting the connection of the taught material with the practice" in the "ideal" lecturer, but only a few students (16.75%) perceived this quality in their teachers to a high degree. Also, only 16.75% of the students thought that their actual teachers possessed to a high degree the ability to "contribute to the development of the necessary professional skills and habits". Furthermore, only a small number of the students (9.75%) thought that their teachers possessed to a high degree the ability to assess impartially.

Only 20% of the students thought that their teachers possessed the ability "to teach scientific knowledge in a simple language", while they valued this ability highly in the "ideal" lecturer. Only 16.75% of the students thought that their teachers possessed to a high degree "wealth and culture of speech". A comparatively small number of the students (21.62%) thought that their teachers possessed to a high degree the skill "to direct attention to principles". A very small proportion of the students (8.65%) thought that their teachers "created conditions for discussion". A large number of the students (80%) thought that the "ideal" lecturer should possess the ability "to illustrate the educational content well", while only 21.08% of the students thought that their teachers possessed this ability to a high degree. Only 9.73% of the students thought that their teachers possessed the ability "to take into consideration the opinion of the students", while 71.89% of the students thought that teachers should possess this ability to a high degree. The number of the students who thought that their teachers showed great paedagogical tact was not large (9.19%), while many students (69.72%) thought that the "ideal" lecturer should possess this quality to a high degree.

There was thus a big discrepancy between the students' expectation and their view of teachers with regard to these educational competences.

Personal Qualities

Here, as with the other two groups of qualities, the same tendency could be observed. The students and the lecturers concluded that the "ideal" lecturer should possess to a high extent the qualities listed in the respective part of the questionnaire. For more than ten indices the difference was not significant. There was a significant difference for "a sense of responsibility", "professional ethics", "a requirement of the principles", "self-evaluation", "fantasy", "civil position", "watchfulness", "accuracy" and "exactness". However, for the qualities: "a sense of responsiblity", "scientific and professional ethics", "stability to external influences" and "charm and personal attractiveness" the difference between the evaluation by the students and the lecturers was not reliable. For the qualities: "efficiency", watchfulness", spiritual balance", "self-watchfulness", "fantasy", "a sense of humour", "self-evaluation" and "quickness of mind", the difference was significant at $P<0.05$. For all other qualities a reliable difference at $P<0.001$ was established.

The opinions of the lecturers about the "real" and the "ideal" lecturer were significantly different. The difference between the perceived "ideal" and "real" lecturer for "a sense of responsibility", "self-evaluation" and "fantasy" was unreliable at a level of significance $P>0.005$. For all the other qualities the difference between the opinion of the lecturers for the "ideal" and the "real" lecturer were reliable.

Conclusions

The students did establish criteria for evaluation of their lecturers. On the basis of these criteria they formed expectations. The students used the same criteria to establish their "ideal" and to evaluate the "real" lecturers. There was a big difference between what the students expect and value highly in the "ideal" lecturer, and what they find to a high degree in their real teachers. Significant differences were also established between teachers' evaluation of the ideal and self-evaluation.

It is neither possible nor necessary to equate the perceptions of the students with those of the lecturers. However, it is necessary for lecturers to know what the students expect of them.

The students' evaluation of their teachers is significant in so far as it builds attitudes towards the lecturers and thus affects the students' confidence in, and respect for their teachers. It determines also the relationship between lecturer and student, as well as the attitude towards the educational process and the subject to be studied.

It should be noted that the students' evaluation is quite subjective. They tend to evaluate from the point of view of their interests and needs. Even so, they have their own criteria, and lecturers should be aware of the criteria by which they are being evaluated by their students.

APPENDIX

The questionnaire and accompanying letter

Dear lecturer (student),

You are invited to participate in this research, which aims to establish your opinion on the qualities of the lecturer in your medical school. We rely on your conscientiousness in completing the questionnaire.

Please identify:

1. Which of the qualities given below make up the "ideal" lecturer, and to what extent (low, medium, high) these qualities should be demonstrated.
2. To what extent do you, as a lecturer, possess these qualities? Please evaluate yourself. As a student, to what extent do you think your lecturers possess these qualities?

Degree

Professional qualities	a) low	medium	high	b) low	medium	high
1. Professional experience	1	2	3	1	2	3
2. Professional knowledge, skills, habits	1	2	3	1	2	3
3. High erudition	1	2	3	1	2	3
4. Skill of communication with patients and their relatives	1	2	3	1	2	3
5. Good professional self-confidence	1	2	3	1	2	3
6. Controls the norms of medical ethics	1	2	3	1	2	3
7. Respects the achievements of other specialists	1	2	3	1	2	3
8. Knows how to stand up for own opinion	1	2	3	1	2	3
9. Ability to work in a health team	1	2	3	1	2	3
10. Ability to act as a specialist	1	2	3	1	2	3
11. Humanism	1	2	3	1	2	3
12. Dedication to professional duty	1	2	3	1	2	3
13. Compassion	1	2	3	1	2	3
14. Empathy	1	2	3	1	2	3
15. Unselfish	1	2	3	1	2	3

Educational	a) low	medium	high	b) low	medium	high
1. Teaches scientific knowledge in a simple language	1	2	3	1	2	3
2. Demonstrates the material in a logical sequence	1	2	3	1	2	3
3. Interprets the scientific knowledge in depth	1	2	3	1	2	3
4. Can direct attention to the essentials of the information	1	2	3	1	2	3
5. Creates conditions for discussion	1	2	3	1	2	3
6. Has respect for the opinions of the students	1	2	3	1	2	3
7. Exhibits a wealth and culture of speech	1	2	3	1	2	3
8. Good demonstration of the educational content	1	2	3	1	2	3
9. Reveals the relationship of the taught material with actual practice	1	2	3	1	2	3
10. Helps to build skills for self-education	1	2	3	1	2	3
11. Helps in the development of professional skills and habits	1	2	3	1	2	3
12. Treats students as individuals	1	2	3	1	2	3
13. Demonstrates educational sensitivity	1	2	3	1	2	3
14. Assesses students objectively and impartially	1	2	3	1	2	3
15. Creates a cheerful and active atmosphere	1	2	3	1	2	3
16. Instills respect for the achievements of our own and foreign scientists	1	2	3	1	2	3

Personal	a) low	medium	high	b) low	medium	high
1. A sense of responsibility	1	2	3	1	2	3
2. Scientific and professional ethics	1	2	3	1	2	3
3. Aware of the requirements of social behaviour	1	2	3	1	2	3
4. Stability in the face of external influences	1	2	3	1	2	3
5. Health and spiritual balance	1	2	3	1	2	3
6. Charm and personal attractiveness	1	2	3	1	2	3
7. Feeling of humour	1	2	3	1	2	3
8. Efficiency	1	2	3	1	2	3
9. Imagination, creativity	1	2	3	1	2	3
10. Initiative	1	2	3	1	2	3
11. Self-criticism	1	2	3	1	2	3
12. Civil position	1	2	3	1	2	3
13. Diligence and capacity for work	1	2	3	1	2	3
14. Awareness of others	1	2	3	1	2	3
15. Self-awareness	1	2	3	1	2	3
16. Quickness of mind	1	2	3	1	2	3
17. Communication	1	2	3	1	2	3
18. Exactness and accuracy	1	2	3	1	2	3
19. Justice	1	2	3	1	2	3

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INNOVATION AND CHANGE

The Role of Evaluation in the Development of a Problem-Based Learning Programme within a Traditional School of Medicine

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Abstract

The gradual development of a problem-based, student-centred clinical sciences course in the first clinical year of a traditional school of medicine is described. After four years, the course replaced the existing lecture-based, didactic clinical sciences programme. Throughout, the impact of the pilot problem-based programme on students' approach to learning and their performance in examinations has been compared with that of the lecture-based programme. The results of this evaluation are described and the role it has played in the process of change and ongoing development is discussed.

Introduction

The literature on the empirical evaluation of undergraduate medical courses is small. The large number of relevant but not easily controllable variables may have deterred many investigators; others may have been convinced they already knew the answers. The introduction of innovative teaching and learning programmes into traditional medical schools is itself such an overwhelming task that time-consuming and difficult evaluation is often neglected.

That the wholesale switch from traditional to problem-based curricula is possible has recently been shown by the Sherbrooke Medical School (Des Marchais, 1991). In contrast to this, we describe the gradual introduction of a problem-based clinical sciences course (PBCSC). Throughout this development we have attempted to evaluate the impact that the changes have had on the students' approach to learning and on their academic performance.

The primary aim of this innovation was that the PBCSC should ultimately replace the didactic lecture-based clinical sciences course (LBC) during the fist year of clinical medicine at the Wellington School of Medicine. This is the 4th year of the medical undergraduate programme of the University of Otago in New Zealand. The goal of replacing the LBC was achieved in 1991 after piloting the PBCSC for four years. A further aim, that the PBCSC should be integrated into the relevant clinical attachments, for

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example predominantly respiratory problems were studied in the general medical run, has only been partially achieved.

The purpose of this paper is to outline the development of this PBCSC, to describe the approaches that were adopted to evaluate it, and to report the results of this evaluation. The discussion will focus on the role that this evaluation has played in the process of change, in the ongoing development of the PBCSC, and in the undergraduate programme as a whole.

Development of the PBCSC

Background

The preclinical years (2nd and 3rd) are spent in Dunedin where problem-based learning (PBL) has been used increasingly as a teaching method since 1986. This innovation followed two Faculty of Medicine residential workshops and a National Conference on the Role of the Doctor in New Zealand (Summary Report, 1985). Until recently, PBL was an intradepartmental initiative using differing approaches and specialist tutors (Heath, 1988; Schwartz, 1989). On completion of 3rd year, students elect to go to one of the three clinical schools in Dunedin, Christchurch or Wellington (Fig. 1).

The Wellington Problem-Based Learning Programme

The stimulus for change came initially from a small group of academics whose knowledge and experience of student centred, small group, problem-based learning, as developed initially at McMaster, had convinced them of it's almost unique ability to promote the development of many skills required by students after graduation. Increasing student enthusiasm for PBL, as indicated by the numbers wishing to take part in the PBCSC, was an important stimulus for its ongoing development (Table I).

Table II outlines the important stages in the development of the PBCSC. An attempt to incorporate PBL into the LBC in 1986 was unsuccessful despite the students' previous experience of PBL. This was an isolated "experiment" in the midst of a didactic programme, where transmission of a large amount of knowledge from teacher to student was the primary goal. Student groups were randomly selected from the class, and most tutors had little experience of PBL.

The first two years of the pilot (1987-8) took the form of a limited PBCSC which was added on to the LBC, using non-specialist tutors and Faculty staff nominated as resource persons. The report to the curriculum committee in 1987 after the fist year concluded that the strengths of student-centred PBL were seriously compromised, if students were also expected to attend a teacher-centred didactic course. This effect was magnified by the presence of an end of year assessment which rewarded recall of facts rather than ability to apply them in the clinical setting. Due to time constraints, no major changes were made to the PBCSC in 1988.

Table I. Student participation in the PBSC 1987-1991

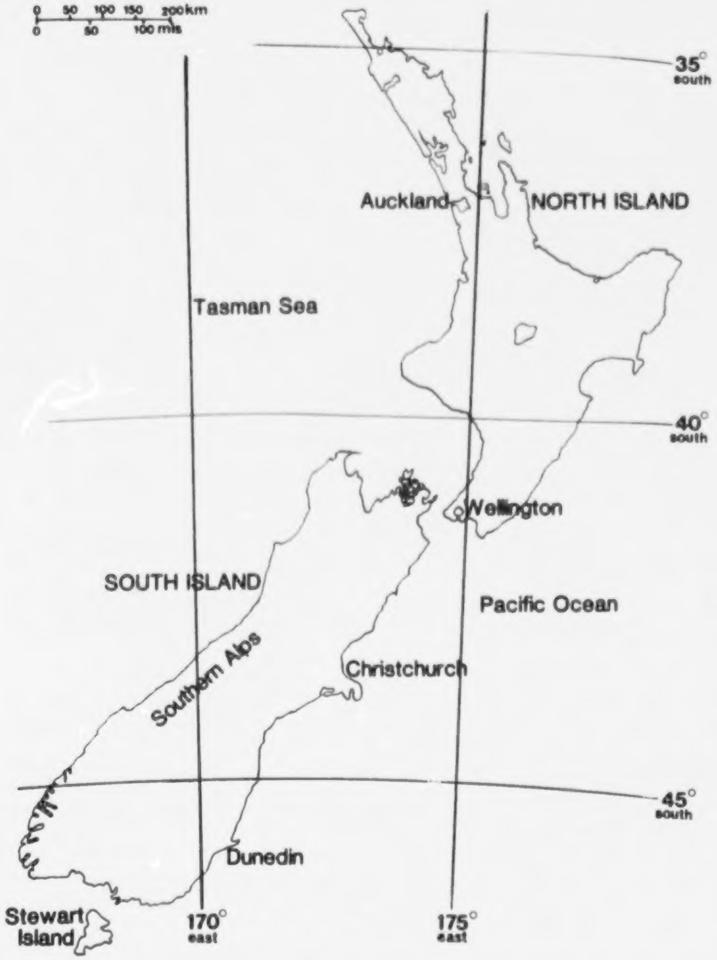
Year	Student Numbers		
	PBCSC.	LBC.	Total
1987	11	39	50
1988	16	44	60
1989	13	46	59
1990	18*	39	57
1991	60	0	60

* A total of 39 students opted for the PBCSC. A ballot had to be held to select 18, the maximum possible, given the available resources.

Table II. Stages in the development of the PBCSC

June 1986:	Unsuccessful incorporation of PBL into the Respiratory section of the LBC.
Dec. 1986:	Approval of 2hrs/week self-directed learning time within the LBC to mount a pilot PBCSC.
March 1987- November 1988:	1st Pilot PBCSC - in addition to the LBC. 5 problems studied over 21 weeks.
Dec. 1988:	Approval of a PBCSC in parallel with the LBC, with a separate pathology programme. Approval to change 4th year examination to an OSCE.
March 1989- November 1990:	2nd Pilot PBCSC - mounted in parallel with the CSC*, 23 problems studied over 29 weeks. Early development of a self-assessment programme (SAP).
July 1990:	Approval that in 1991 the LBC should be replaced by the PBCSC with a separate pathology programme. Continued development of the SAP.
March 1991:	Whole class PBCSC with 2hr/wk lecture programme.

* CSC = Clinical Science Course


0 50 100 150 200km
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35° south
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175° east
Auckland
NORTH ISLAND
Tasman Sea
Wellington
SOUTH ISLAND
Pacific Ocean
Southern Alps
Christchurch
Dunedin
Stewart Island

Figure 1. Location of the three clinical schools of the Faculty of Medicine, University of Otago

The nature and results of the formal evaluation of the 1987/88 PBCSC were reported briefly (Mellsop et al., 1989) and are further described below.

In October 1988, a small group of 3rd year students indicated that they would prefer to learn their 4th year clinical sciences in a problem-based rather than a lecture-based programme. A proposal to mount a PBCSC in parallel with the LBC in 1989, with all students attending a separate pathology programme, was approved by the Wellington Faculty in December 1988. Fifteen students volunteered to take part in this parallel PBCSC.

Discussion with the LBC subspecialty working parties, and analysis of the content of the 1988 lecture programme led to the definition of a "core clinical sciences curriculum". On this basis eighteen new patient problems (PP) were selected. The design of the existing five PP's was modifies in the light of the 1987/88 experience, and this structure was adopted for all the PP's.

As before, in addition to the case material, each PP included specific learning objectives and recommended learning resources for use by the students. This parallel programme ran for two years (1989-90). Every attempt was made to integrate the PP's to be studied with the content of the students' current clinical attachment.

A self Assessment Programme has been developed alongside the tutorial programme since 1989. Various formats have been used for the self-assessment modules. The commonest is the Modified Essay Question. Almost all these modules are problem-based. Cases have been selected and the modules designed to reinforce and expand the students' knowledge and understanding of common and important clinical problems. As with the PP's, there are specific learning objectives and recommended learning resources for each module, and the students' also have access to the model answers and to nominated resource persons. This programme is still in it's development phase.

Approval was obtained in December 1988 to change the format of the end of 4th year summative assessment from a short answer, factual recall format (primarily testing the clinical sciences) to an Objective Structured Clinical Examination (OSCE) which would assess both the clinical sciences programmes (CSP) and the clinical attachments. Students were to sit a formative mid-year examination to familiarise themselves with the format. Pathology would be assessed separately, with a written knowledge-based examination and a practical.

In July 1990 the Faculty in Wellington approved a proposal that the LBC should be replaced by a whole-class PBCSC in 1991. This was to be administered in a similar way to the 1989/90 parallel PBCSC, except that it would include a "core concept" clinical sciences lecture programme with a maximum of 2 lectures a week. Pathology would remain a separate programme. The formal evaluation of the 1991 whole-class PBCSC has yet to be completed.

Evaluation of the Problem-Based Clinical Sciences Course

Throughout the four year pilot phase, there have been two major components to the evaluation, measurement of the students' approach to learning and of their academic achievement, both before and on completion of the programme.

Evaluation of Approach to Learning

The tool selected was the Adelaide Diagnostic Learning Inventory for Medical Students (ADLIMS) developed by Newble et al. (1988). This had been administered in 1986 to 2nd and 3rd Year students in Dunedin, and we used these data to reexamine the factor structure using the FACTOREP procedure (Welch et al., 1990). As a result, instead of the 4 factor structure, described by Newble, three subscales were defined with acceptable replicability across the two medical student populations, and 14 of the 53 ADLIMS items were discarded. Three approaches to learning were identified:

Subscale 1: Low motivation to study and distraction arising from social activities.
Subscale 2: Worry arising from high achievement expectations that are hampered by superficial learning or disorganised study habit.
Subscale 3: Learning characterised by visualisation, inquisitiveness, reflection, hypothesis generation and the linking of concepts across subjects studied.

Subscale 3 resembles the "deep approach" discussed by Newble and Entwistle (1986). The other two subscales represent unfavourable approaches to learning. Subscale 2 includes the "superficial approach" which they also discuss, but the "strategic approach" they describe does not emerge as a distinct entity.

We have used this modified version of ADLIMS (Newble et al., 1988) to survey medical student populations; not as a "diagnostic" tool to identify individual students whose approach to learning is predictive of unsatisfactory performance, the purpose for which ADLIMS had been developed. Our aim has been to discriminate confidently between different populations of students as regards favourable (subscale 3) versus unfavourable (subscales 1 and 2) approaches to learning. In the longer term, we are keen to monitor changes over time within the student populations.

Evaluation of Academic Performance

Results in the summative examinations have been used as the measure of academic performance. Table III details the content and format of each examination. Marks obtained during the preclinical years have allowed us to establish whether the academic performance of students electing to take part in the PBCSC differed from that of students with a preference for the LBC.

The 4th year examination in 1987 and 1988 assessed the clinical sciences course, largely demanding factual recall and rarely assessing ability to apply knowledge. The OSCE in 1989 and 1990 corrected this deficiency to a significant extent but expanded the content assessed to include the clinical attachments. As all students attended the same clinical attachments during the year and as clinical skills and clinical sciences learning are interdependent, this is not seen to be a problem. The pathology examinations were almost exclusively knowledge based.

Statistical comparisons of the PBCSC and LBC groups involved the use of a non-parametric analysis of variance initially, with subsequent pair-wise comparisons where statistically significant overall differences were found.

Table III. Evaluation of academic performance: content and format of summative examinations

2nd year 1986-89:
- anatomy-2W/Ps*; Practical; Viva; I/C Ass.*
- biochemistry-2W/Ps; 2 Essays.
- physiology-2W/Ps; Viva; I/C Ass.

3rd year 1986-89:
- preclinical neurology-W/P; Practical.
- abnormal structure & function-W/P; Practical.
- behavioural sciences-W/P; Assignment.

4th year 1987-90 pathology: W/P; Essay; Practical.

4th year 1987-88 clinical sciences:
12 short answer questions, predominantly:
1987: 9 factual recall, 3 problem solving;
1988: 10 factual recall, 2 problem solving.

4th year 1989-90 clinical sciences & clinical attachments:
OSCE - 20 station 1989/ 16 station 1990, predominantly:
1989: 2 clinical, 11 problem solving, 7 factual recall;
1990: 7 clinical, 7 problem solving, 2 factual recall.

* W/P = written paper. I/C Ass. = in-course assessment.

Outcome of the Evaluation

Pre PBCSC Academic Performance

The marks obtained by each student in the 2nd and 3rd year examinations were totalled, and the average mark for the PBCSC and LBC students were compared. No difference was found between the PBCSC students and those attending the LBC for any of the four years of the pilot programme.

The 1987/88 Pilot PBCSC

Given the small number of students taking part in the PBCSC and the identical format of the 4th year programmes for 1987 and 1988, the two classes were analysed together. Complete data sets were available for 107 of the 110 students, 27 of whom volunteered to take part in the pilot PBCSC.

The modified ADLIMS was administered at the start of the 4th year. No significant difference between the two groups was detected for any of the three subscales. This was also the case for the marks in the end of year clinical sciences examination and the final mark for the 4th year which includes the results of the separate pathology examination.

Conclusions

1. Students opting for the PBCSC did not self-select for the PBCSC on the basis of superior past examination performance or due to their different approach to learning, in particular, a preference for the "deep approach".

2. Students opting to attend both the PBCSC and the LBC performed as well in the end of year examinations as those only attending the LBC. This was so despite the PBCSC students having an increased workload and sitting examinations designed to assess factual recall rather than the application of knowledge.

The 1989 Parallel Pilot PBCSC Programme

Thirteen students volunteered to join the PBCSC with 46 attending the LBC. Complete data sets were available for 12/13 and 43/46 students respectively, an overall return rate of 93% for the modified ADLIMS administered at the start of 4th year. Unfortunately, the return rate for the ADLIMS administered at the end of 4th year was only just above 50% precluding these data from the evaluation.

The PBCSC students scored more highly for the "deep learning" subscales 3 at the start of 4th year than did the LBC students. This reached statistical significance ($p=0.012$). No difference was present for subscales 1 and 2.

Conclusions

1.Self-selection by students volunteering for this problem-based course has been demonstrated in terms of their approach to learning, but their performance in past examinations had not been superior. This may well reflect a far greater commitment to PBL and adoption of the learning skills it promotes. This is felt likely, given the risks these students were accepting by taking part in an untested clinical sciences course which contributed significantly to the final mark for 4th Year.

2.Superior performance in the OSCE by the PBCSC students appears to support the hypothesis that they are better able to apply their knowledge of the clinical sciences and have better developed clinical reasoning skills than the LBC students. This is in part at least likely due to the self-selection that had taken place and also the effects known to occur in the first cohorts of students participating in innovative programmes.
In contrast to this, the PBCSC and LBC students performed equally well in the pathology

examination. This supports the finding in 1987/88 that problem-based learning does not compromise performance in knowledge based examinations.

The 1990 Parallel Pilot PBCSC

39 students, 68% of the class, expressed a preference for the PBCSC at the start of their 4th year. Due to limited resources, a ballot was held to select 18 students. Those 21 students not balloted joined the 18 students who had opted for the LBC. These events provided us with a quasi experimental situation and the opportunity to take PBL preference into account in our evaluation of the 1990 programme. For this reason the analysis compared three groups; Group 1 (n=18) comprising students who attended the PBCSC, Group 2 (n=17) comprised those interested in PBL not balloted for the PBCSC, and Group 3 (n=18) comprised those expressing preference for the LBC.

No significant difference was found between the three groups for any of the three ADLIMS subscales at the start of the 4th year (90% return). We administered the modified ADLIMS again to this 4th Year class at the start of their 5th year. 93% of those who returned the 4th year ADLIMS completed it in 5th year.

Results showed a significant overall difference for subscale 3 only. Subsequent pair-wise comparisons showed a significant difference between Group 1 and Group 3 ($Z=1.96$, $p<.05$). This was also so for Group 1 and Group 2 ($Z=2.34$, $p<.02$). The difference between Group 2 and Group 3 was not significant.

No significant differences were found between the performance of the groups in the end of year OSCE or in the pathology examination. Retrospectively, the items in the OSCE were classified as predominantly testing knowledge, problem solving skills or clinical skills. The average mark obtained for the problem solving items did not differ significantly between the groups.

Conclusions

1. Those students expressing a preference for PBL and able to participate in the PBCSC appear to have their "deep" approach to learning reinforced by the experience. This contrasts with those students whose preference for PBL could not be met and who had to attend a didactic lecture based course. They scored significantly lower than the PBCSC students on the "deep approach" subscale at the end of the year.

2. These results raise the possibility that a traditional teacher-centred didactic course has inhibited students from adopting the more favourable "deep" approach to learning. This possibility has also been raised by Coles (1985).

3. The comparison of examination results confirm earlier reports that participation in a problem-based learning programme does not harm performance in knowledge based examinations (Schmidt et al., 1987). We were unable to demonstrate superior problem solving skills in those students attending the PBCSC.

Discussion

Coles and Grant (1985) describe evaluation as "a deliberate act of enquiry which sets out with the intention of allowing people concerned with an educational event to make rigorous, informed judgements and decisions about it, so that appropriate development may be facilitated". We wonder how often this intention, which was indeed our own, is actually realised.

The result of the present evaluation provide support for the favourable impact of PBL curricula on students' approach to learning (Coles, 1985; Newble et al., 1986). The major difference with this evaluation is that the effect has been demonstrated in a group of students attending a discreet problem-based course in an otherwise identical teaching programme. Importantly, the group showed no difference in their approach to learning from the non-PBL groups at the start of the PBCSC. The results also support the apparent negative effect of a teacher-centred didactic programme, previously referred to by Coles (1985).

Apart from the 1989 cohort, no differences in examination performance have been demonstrated between the LBC and the PBCSC students. As yet we have been unable, due to limited resources and time, to compare the subsequent academic performance of the 1989 and 1990 groups at the end of their 5th Year, when they sit a common summative examination. We intend to do this and to repeat administration of the modified ADLIMS.

Relationship of Evaluation to Change

We have been encouraged by these results but acknowledge that they have played no part in achieving the goal of replacing the 4th Year LBC with a PBCSC. Each major step in the process of change long preceded completion of the analysis of the evaluation. Even now, many Faculty colleagues will not be aware of the results.

Certainly, in the short term, this evaluation has not fulfilled the intention outlined by Coles and Grant. Instead the decisions leading to change were strongly influenced by the increasing support for PBL by the 3rd Year students destined for Wellington. We have no data to suggest that the PBCSC option influenced their choice of clinical school except for half of the 1989 PBCSC volunteers. However, without substantial support from the Faculty, the decision to move to a whole class PBCSC would not have been taken. What were the factors influencing Faculty members, most of whom had no knowledge or experience of student centred PBL?

From the start, the Dean and the Curriculum Committee supported the gradual approach to the development of the PBCSC. Because so few of the Faculty staff had any knowledge of student-centred PBL, staff development has been emphasized throughout. A system of "apprentice" tutors has probably been the most effective influence. Faculty involvement as resource persons and in the development of the PP's and later in the self-assessment modules has also been important. A staff questionnaire was administered at the start of the

1991 whole class PBCSC to determine the extent of staff support. We also determined (in retrospect) the extent of support for the PBCSC when the decision was taken to replace the LBC eight months before. Support increased from 65% to 77% over the eight months. A two day workshop in December 1990, led by a tutor from the Newcastle Faculty of Medicine, Australia, contributed to this increased support in the Faculty.

The Future

To achieve the original goal of the PBCSC, the programme has to be fully integrated with the clinical attachments. Attempts to do this in 1991 have not succeeded, due to time tabling issues which could not be resolved in the time available. There is general acceptance by the Faculty of the principle of integration which involves extending the PBCSC into the 5th Year programme.

Plans to evaluate the 1992 PBCSC are presently under way. Because the three Schools of Clinical Medicine in Wellington, Christchurch and Dunedin have adopted different approaches to clinical sciences teaching, we are exploring the feasibility of evaluating the three programmes using a similar approach to that described above but including if possible an evaluation of clinical competence. Potential confounding factors will be taken into account as far as possible. Of particular interest is the opportunity this would provide to study this cohort of students during the rest of their undergraduate and early postgraduate careers.

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Carrying PBL into the Clerkship: A Second Reform in the Sherbrooke Curriculum

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Abstract

Sherbrooke had to face another educational challenge when its first problem-based learning (PBL) cohort came to the clerkship, the clinical years of the undergraduate curriculum. The Faculty took advantage of educationally well-trained academics and a few clinical teachers ready to innovate. Lead by respected clinicians, who became internal change agents, a new clerkship was designed to carry on the PBL philosophy into the clinical years. Bi-weekly sessions on learning clinical reasoning (LCR) in each rotations has become the instructional format for extending the PBL philosophy and for partially correcting many problems of traditional clerkship education. With the introduction of protected time for study, objective-structured clinical examination and definition of learning objectives in terms of clinical problems and pathological conditions, a better balance has been established between the instructional needs and the service needs, both components of the students' educational experience. After a period of eighteen months, the new clerkship with its special educational conditions is well established.

Introduction

Since McMaster University introduced Problem-Based Learning (PBL) (Spaulding, 1969) only a few new schools have adopted the PBL method. However, the GPEP Report (Physicians for the Twenty-First Century, 1984) has wrought an impetus of change in medical education, and some schools have choosen the PBL instructional format as a parallel curriculum (Kantrowitz et al., 1987). Sherbrooke was the first to report a complete shift from its traditional course to a full scale PBL preclinical curriculum (Des Marchais et al., 1990; Des Marchais, 1991; Des Marchais et al., in press).

While few schools have overtly extended PBL into the clinical years (Schwartz et al., 1991), the PBL curriculum change at Sherbrooke introduced such a shaking-up of the educational milieu (Des Marchais et al., 1990; Des Marchais, 1991; Des Marchais et al., in press) that the clerkship of the first cohort of the new programme was seen as a golden opportunity to review in depth the clinical phase of its four year programme. The 1986 planning document on curriculum reform (Le programme des études médicales

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prédoctorales, 1987) stated that the clerkship should be extended from twelve to eighteen months. In a research project in 1988 the hypothesis was raised whether it would be possible to continue the PBL philosophy into the clerkship, to continue to enhance student autonomy, and to extend the student-centred educational continuum into the clinical years.

This paper reports on the introduction of a new instructional format in the clerkship, the sessions on learning clinical reasoning (LCR). A discussion of problems of clinical education and mastery of clinical reasoning, subsequent to problem-based learning in the preclinical period, is followed by a description of the organisational, human and material changes. The paper concludes with an explanation of the process of successful change and what might be identified as a first impact of this new experience.

The Challenge

The study of the basic sciences through a PBL preclinical curriculum is so great a change from the traditional approach, that it is difficult to accept that students should continue their studies in a traditional clerkship. Students are bound to have experienced a quite different preparation for the clerkship if they come from a PBL curriculum. Very little has been written about this expectation. Students would be expected to be more active in discussing clinical assumptions, to raise more questions and to suggest early exploratory hypotheses. They would be expected to continue to build up their bank of basic data in working through problems, now real clinical problems. The preclinical years should have developed self-directed learning which should be reinforced throughout the clerkship. The opportunity, indeed the need for a second educational reform, presented itself: is it possible to offer a student-centred clerkship by carrying on with the PBL approach?

Numerous major problems had been identified in traditional clinical education (Physicians for the Twenty-First Century, 1984; McLoid et al, 1985; Morgan, 1986; Irby, 1986; Ambrey, 1985; Mellinkoff, 1987). Despite learning being based on clinical problems, students tend to be passive observers most of the time within the hierarchy of the health care system. Their clinical reasoning is seldom challenged, revealed or assessed in the day to day care of patients. The clinical work-up is mostly planned by the consultants or registrars in the outpatient clinic or emergency room. Observable and measurable learning objectives, described in specific realistic terms, are rarely available to the students.

Clinical cases, the clinical student's learning material, are somewhat unpredictable and not always appropriate for the current set of learning objectives. The majority of the clinical teaching occurs on the ward and frequently in tertiary care hospitals, when patients are acutely ill, present multiple, concomitant pathological conditions, and require subspecialty expertise and technology. This setting is disease-orientated and focuses on selective problems. Junior clinical students are not well prepared for patients with several diseases and with limited cooperation. At least in the Canadian system, other patients are admitted only for short stay for diagnostic or therapeutic procedures. In this setting, some major steps of the clinical reasoning process, that is hypothesis generation and the inquiry strategy may be bypassed somewhat.

The role of the clerk is ill defined. The balance between his traditional service tasks and his mandatory participation in educational activities is precarious and fragile. Not infrequently, his responsibilities may even be shifted away from patient care to routine paper work and the collection of missing reports.

PBL is based on the early generation of hypotheses (Barrows et al., 1980; Schmidt, 1983) according to the hypothetico-deductive model (Elstein et al., 1978), and the inquiring process follows the generation of hypotheses. The PBL model differs from that used in the traditional clerkship where the clinical student is asked for a formal and comprehensive assessment of the patient's problems; traditionally, all clinical cues must first be assembled before any generation of hypotheses is permitted. Yet in clinical reality, the clinician generates early on a series of hypotheses (Barrows et al., 1980; Elstein et al., 1978) which guide his search for relevant cues. A congruent, valid learning format should offer the same process in the clerkship.

Although generally accepted, the hypothetico-deductive model has been challenged as a complete explanation of clinical reasoning. The inconsistency of performance by students in relation to different problems has raised the possibility that problem solving might be even more dependent on case-related knowledge ("case specificity") than upon the efficient and exclusive use of the hypothesis generation and testing method (McGuire, 1985; Groen et al., 1985). Background knowledge is thus essential to support clinical reasoning. The study of specific priority problems would, therefore, seem desirable; but which problems within a discipline should a clerk be able to solve and which pathological conditions should a clerk be able to treat in order to master sufficiently that discipline? The definition of learning objectives in terms of priority problems and conditions is thus a mandatory requisite for each clerkship rotation.

Learning is difficult if the educational format does not include feedback (Groen et al., 1985). If the goal is mastery of the steps of clinical reasoning, the student needs to become competent in the intermediate or component steps, and early feedback becomes essential. Successful feedback, in turn, calls for thinking aloud (Elstein et al., 1978) on the part of the student. Verbalising the thinking process as it occurs provides the tutor or supervisor with reliable information without significant interference with the student's process of reasoning.

In the Sherbrooke curriculum, the PBL preclinical two and a half years facilitate the study of the basis of medicine by integration of basic and clinical sciences through the analysis of problems, identification of what needs to be learned and application of such learning to the problem. Understanding of the underlying principles and mechanisms at the levels of analysis, synthesis and evaluation becomes the main focus of the instructional method. Clinical diagnosis is not essential at this stage and not sollicitated by PBL tutors. In the first semester of the third year, the focus is progressively shifted more toward problem solving, investigation and therapeutics. The clerkship must then offer the opportunity to progress in that direction and to develop mastery of the clinical reasoning process.

At the bedside, the iterative process of clinical reasoning proceeds rapidly. Hypotheses generation and testing are now assessed through a problem-orientated inquiry strategy using every clinical skill of information gathering, physical examination and laboratory investigation. To arrive at the right diagnosis and the best management is the *raison d'être* of problem solving during the clerkship. To be congruent with clinical reasoning, the instructional format should stimulate the real clinical encounter and permit the practice of a rapid, iterative process. PBL, as it is used in the preclinical curriculum, had to be adapted.

In brief, the goals of the clerkship reform are: 1) to establish a balance between service and educational needs by setting aside sufficient protected time for educational activities; 2) to define specific learning objectives in terms of clinical problems and pathological conditions relevant to each of the disciplines; 3) to make provision for variability and unpredictability of clinical exposure vis-à-vis the determined objectives; and 4) to offer educational experiences which take into account that the students have had prior experience of PBL and active participation, and that the students are responsible and autonomous learners, capable of organising their learning through personal objectives.

Components of the Reform

The reform of the clerkship has been aimed towards an increased exposure to primary care and community-based hospitals; a better definition of specific objectives in terms of priority problems and conditions; the development and introduction of a new educational format; bi-weekly sessions on learning clinical reasoning (LCR); the implementation of protected time which ideally represents about 15 to 20% of free daily time for personal work and integrated study pertinent to the patient which the student has seen; and development of congruent student assessment. A brief description of the composition and sequence of the clerkship rotations will be followed by a discussion of the objectives and the sessions on LCR. The Sherbrooke clerkship lasts sixty eight weeks (Table I).

After three months of rotations in community health and two electives, the regular clerkship disciplines are spread over one year, so that two cohorts of students do not overlap. In the regular rotations, seven weeks of family medicine and walk-in clinic care, and a new three and a half week of a multidisciplinary rotation (including ENT, ophtalmology and dermatology) have been introduced. The remaining period is used for rotation through the traditional disciplines (medicine, surgery, obstetrics and gynaecology, paediatrics, and psychiatry) with the inclusion of the new educational activity - the sessions on learning clinical reasoning (LCR).

Learning Objectives: Priority Problems and Conditions

Eighteen months before the start of the new clerkship, the mandate of the educational reform was accepted by an ad hoc committee consisting of the clerkship coordinator, influential academics and clinical teachers with specific background in medical education.

Table I. Clerkship rotations

January - April	
Community Health	4 weeks
Elective 1	4 weeks
Elective 2	4 weeks
April to March	
General Internal Medicine	3,5 weeks
* Multidisciplinary	3,5 weeks
Family Medicine and Walk-in Clinics	7 weeks
Vacation - July	1 week
Surgery	7 weeks
Paediatrics	7 weeks
Gynaecology-Obstetrics	7 weeks
Medical subspecialty	7 weeks
Vacation - Christmas	2 weeks
Psychiatry	7 weeks
April 1 to May 12	
Preparation for National Certification Examination	
May 13 - June 7	
Elective	3 weeks
TOTAL	**68 weeks**

* Multidisciplinary: ENT, ophtalmology, dermatology.

They were asked to develop appropriate educational experiences. Their first task was to identify mandatory learning objectives.

It was agreed from the start that each rotation should define specific objectives in terms of priority clinical problems and pathological conditions. Lists, such as that of the Medical Council of Canada (Medical Council of Canada, 1985), were used to compile a set of problems and conditions by each department and these were validated by the special ad hoc committee.

The mandatory clinical problems were then linked with the LCR sessions which cover all the priority problems. In addition to these problems, a list of pathological conditions had to be specified (Table II).

Table II. Priority problems and conditions

	Problems	**Pathological Condition**	**Total**
Surgery	14	45	59
Medicine	19	42	61
Gynaecology/Obstetrics	13	47	60
Paediatrics	14	43	57
Psychiatry	7	21	28
Total	**67**	**198**	**265**

A proportion of these conditions is also explored through the LCR sessions. The pathological conditions that are not discussed during the LCR sessions are expected to be studied in the context of the students' regular clinical activities and individual work during the rotation. At the end of the five regular rotations, the students have to demonstrate their ability to generate and test diagnostic hypotheses, to plan an appropriate laboratory investigation and to delineate the principles of therapy for each of the 67 clinical problems and the 198 pathological conditions (Table III, Table IV)

Table III. Example: Priority clinical problems for rotation in medicine

1. Chest pain
2. Dyspnoea
3. Cough
4. Syncope
5. Haemoptysis
6. Shock
7. Headache
8. Fatigue
9. Coma
10. Confusion
11. Swollen legs
12. Black stools
13. Hypertension
14. Diarrhoea
15. Jaundice
16. Fever and chills
17. Acute renal failure
18. Weight loss
19. Arthritis

Table IV. Example: Twenty two of fourty three priority pathological conditions for the paediatric rotation

1. Hyaline membrane disease
2. Jaundice in the newborn
3. Hypoglycaemia in the newborn
4. Cystic fibrosis of the pancreas
5. Asthma
6. Cardiac failure
7. Innocent heart murmur
8. Mental retardation
9. Cerebral palsy
10. Febrile convulsion
11. Colic in the infant
12. Immunisation
13. Battered child syndrome
14. Acute pharyngitis
15. Acute otitis media
16. Sinusitis
17. Varicella
18. Measles
19. Rubella (German measles)
20. Roseola infantum
21. Scarlet fever
22. Whooping cough

Assessment

We also have modified the assessment system to be congruent with the objectives. At the end of every rotation, an objective-structured clinical examination (OSCE) (Harden et al., 1979; Van der Vleuten et al., 1990) has been developed that focuses on the assessment of different steps in the clinical reasoning process. Three major types of stations are included in the OSCE for the priority problems and condition studied during the rotation. In the first two types of OSCE stations the student is faced with a simulated patient presenting a clinical problem for which the student has to undertake a focused history or physical examination and demonstrate hypothesis generation and a hypothesis-driven inquiry strategy. The other type of station is a structured oral examination based on a clinical vignette where the student has to elaborate a pertinent differential diagnosis, as well as appropriate laboratory investigations and therapy.

Learning Clinical Reasoning (LCR) Sessions

It became evident to the ad hoc planning committee that a systematic, standardised learning activity had to be developed, if the curriculum was to carry the PBL approach into the clerkship. During the first two years of the programme at Sherbrooke the PBL learning activity (Des Marchais et al., 1990; Schmidt, 1983) is focused only on analysis and an understanding of problems and does not include discussion of diagnosis and therapy. Such discussions do not begin until the first semester of the third year. We accept that the PBL method is primarily intended for the study of the foundation of medicine by integrating basic sciences with an understanding of clinical problems, arranged in the organ system curriculum design. In the clerkship, students undertake the other phase of the study of medicine, the long process of mastering clinical reasoning.

We, therefore, designed the new clerkship instructional format, the sessions on learning clinical reasoning (LCR). The educational intention is to give students the opportunity to practise clinical reasoning on specific problems. The students are encouraged to practise the intellectual activity of thinking aloud. This requires them to be active, to receive continuous feedback and to shape their clinical reasoning. These activities favour a more conscious process of thinking and enhance the students' autonomy.

The session of LCR lasts an hour and a half on a bi-weekly basis. The goal is for the students to learn the process of working up simulated clinical cases, in order to master investigation and treatment of patient problems. This learning format was also developed to counteract unpredictable clinical exposure and the great variability of clinical opportunities, and to give each student a fair, standardised and systematic opportunity to confront each of the 67 priority clinical problems. It became necessary to develop a bank of these clinical problems and pathological conditions. For each of the priority problems, a clinical vignette was written with all the pertinent positive findings of history, physical examination and laboratory investigation. These data are documented together with occasional clinical records, such as radiographs. Each case has to be sufficiently complex and rich to satisfy the educational intentions and the goal of learning clinical reasoning. However, the documentation has to be sufficiently succint to trigger and complete discussion in the available time. All cases concentrate on priority problems and conditions and they are based on real patients to provide realism and to facilitate the use of radiographs and laboratory data.

During a rotation, a group of five to eight clerks meet with a clinician who acts as the resource expert in the discipline of the rotation. One clerk takes charge of the "data bank"; he will have familiarised himself with the clinical case in advance. He will give specific information as his fellow students request it. One student takes on the role of the interviewer. He begins to generate hypotheses and tries to obtain pertinent information in an iterative approach (Kassirer, 1983). The student with the "data bank" will reveal information only as it is specifically requested, and each question has to be justified by the thinking-aloud-procedure which is monitored by the clinical instructor. As the process moves on towards physical examination and investigation procedures, the hypotheses are reviewed and reexamined with new data. The instructor observes the process and shapes the clinical reasoning steps as they relate to his own specialty. Once, the interviewer has completed the exploration of his hypotheses, he hands his role on to another student who will, in turn, pass the task on to another student, and so on. In this manner, everybody participates in the session. While the individual reasoning process is respected, other students may be invited to participate or they may do so at their own request. In this manner the problem is analysed into a short list of pertinent hypotheses (differential diagnosis). Subsequent laboratory investigations are selected to eliminate or prove the potential diagnosis. When the probable or proven diagnosis has been selected, the treatment is planned accordingly. Throughout the progress the instructor corrects, initiates and enhances particular steps in the clinical reasoning process. The group, lead by the instructor, will then proceed to generalise and to develop a systematic and logical approach to the priority problem and the condition that have been discussed. This step is critical to facilitate transferance of knowledge and process to further and different clinical cases. At the end of the session, the group will spend a few minutes to review the process of the group's learning. Finally, each student is asked to define his personal learning objectives for which he will have the responsibility to achieve mastery through his own further studies.

As during the preclinical PBL, one student will assume the role of secretary and write on the blackboard the important elements at each step of the process. The clinical instructor plays two main roles. He leads the group and stimulates student participation to sustain the process in an enjoyable climate. Secondly, the instructor is the role model for clinical reasoning which may differ with different disciplines. He initiates, assists, stimulates, and reorientates the student who is engaged in hypothesis generation, information gathering, planning investigation or therapy.

There are clear differences between the preclinical PBL and the clinical LCR sessions. In the preclinical years the students at Sherbrooke learn by being confronted with contextual clinical problems that have been arranged by organs and systems. The students structure their knowledge around problems and they are encouraged to use the basic sciences to reach optimal explanations for the problem. During the clerkship, students continue to built their knowledge around problems, this time, however, divided into clinical disciplines. Here, they apply their knowledge more specifically to the clinical reasoning steps towards the best solution (not only explanation) of the problems. Here the clinical reasoning sessions place emphasis first on application of previous learning and only secondly on identification of the need for further learning.

Implementation and First Experience

The decision to continue the PBL approach in the clerkship was taken by the Vice-Dean for Education, the Director of the M.D. programme and the Clerkship Coordinator. The planning of the new undergraduate PBL curriculum in 1987 included a modification of the clerkship (Des Marchais, 1991; Université de Sherbrooke, 1987). It was, therefore, logical to complete the mandate. The internal change agents had the clear perception that they should not miss the golden opportunity of the first cohort coming up to their clerkship and the generally favourable climate for educational innovation. Moreover, the clerkship coordinator was in the process of acquiring educational expertise and he was helped in his task of reforming the clerkship by a young clinician who had joined the Faculty with a brand new Masters degree in Education. These colleagues worked as a team. The proposal for reforming the clerkship was then accepted by all the administrative committees.

The institution had invested a great deal in the educational development of its academic staff (Grand'Maison et al., 1991). Clinical academics who were already involved as PBL tutors perceived the new clerkship as the natural evolution of a student-centred curriculum and became early participants in this endeavour. Each major clinical department had at least one clinician who had acquired some educational expertise through the one year training programme (Des Marchais et al., 1990) and who was already involved in education for a fair proportion of his professional time. The clerkship reform was, therefore, based from the beginning on a critical mass of competent and collaborative colleagues. It was thus not too difficult to develop the bi-weekly sessions on LCR. Each department nominated one clinician to be responsible for the construct of the case bank, for planning the implementation and for helping his peers to become LCR instructors. As the LCR instructional method is so close to normal clinician practice, it was easy to replicate the same thinking with students in the sessions on LCR. To spread this innovation, members of a department were invited to a special meeting where the new format was explained and illustrated with a videotape.

Just as the implementation of the preclinical PBL was accomplished without using a parallel experimental track (Des Marchais, 1991), a complete revision of the clinical course was choosen as the model for change. From the very first day, each department had to offer bi-weekly sessions on LCR. The strength of the demand for this change and student support, together with some improvisation made it work successfully. Eighteen months later, the LCR sessions have become an integral part of the rotations in all five major disciplines. Some clinical problems that have not been analysed in any depth, were now systematically thought through.

Formal student evaluation questionnaires are administered after each rotation. The response rate is around 90%. First analysis of the results revealed that LCR sessions are greatly appreciated by the students who attend virtually all sessions. The LCR sessions have partially replaced other educational activities of the former clerkship. After the initial investment of time and resources for the development of the bank of clinical cases, the OSCE and the training of colleagues, the new clerkship is now supported at no additional cost. The perception of the instructors is generally positive.
After one year of sessions on LCR, the major difficulty is to standardise the method

throughout the five different disciplines. The numerous different instructors and the different teaching hospitals, where these sessions take place, may in part explain the heterogeneous application of the LCR methodology. Occasionally a session may deviate and become a mini-lecture or assume a seminar format. The principles of the LCR session must remain but their application may differ according to the nature of the discipline itself. It may even differ according to the instructor. Yet to be exposed to the individual clinical reasoning process of numerous experienced clinicians is a powerful way of learning. Some minor variations seem to be useful, in order to meet specific requirements of a particular discipline. As an example, in psychiatry the instructor plays the role of the "data bank" in order to provide not only the basic facts of the clinical case but also the non-verbal and gesticular cues. The sessions are also longer in that discipline (2 hours) to permit the complete and realistic unfolding of the clinical situation. Another example is paediatrics where background knowledge may be insufficient for some problems (e.g. battered child). Here the students might have to do some preparatory readings to develop sufficient structured knowledge to support the process of clinical reasoning.
Scheduling was also an initial problem for the medicine and surgery rotations where the clerks who are engaged in different subspecialties have to be brought together in order to participate in the same LCR sessions.

At present the educational activities are well implemented. Additional effort will be devoted in the near future to the standardisation of the method, the updating of the clinical problems and do the refinement of the instructor's role. Similarly, the OSCE will be enriched with new stations and with the regular use of standardised patients.
By and large, this second major curriculum change has not been too costly in terms of the teachers' time. The sessions on LCR have replaced the numerous lectures of the traditional clerkship. The implementation of OSCE was a necessary complement, and the clinicians like to check real performance, even though more time is involved. We took advantage of the momentum engendered by the preclinical reform, and many young clinicians used the clerkship reform to gain points toward their academic promotion. In brief, the staff is generally satisfied with the new clerkship where the students are now much better able to express their clinical reasoning.

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Changing Medical Education in the United Kingdom: The role of a Non-Governmental Organisation

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Abstract

This paper describes and evaluates the role of a non-governmental organisation, the King's Fund Centre, in bringing about change in undergraduate medical education in the UK. The chosen strategy, a national enquiry using the Delphi technique, is outlined in terms of the method and process. The outcome is described, and the success of the King's Fund Centre as a change agent is analysed.

Introduction

The King's Fund Centre (KFC) is a health services development agency which promotes improvements in health and social care with the aim of ensuring that good developments are widely taken up. The Centre is part of the King's Fund, which is an independent charity which seeks to stimulate good practice and innovation in all aspects of health care and management through research and development, education, policy analysis and direct grants. One of the main areas of interest of KFC is the future provision of services in London, including the future delivery of acute services and the interface between hospital and community. Recent developments in medical care and the re-organisation of the UK National Health Service, on the basis of managed competition, have demonstrated the need for a new programme of development work focusing on the interface between health service delivery and undergraduate medical education in relation to clinical teaching.

Many medical schools have been experiencing problems in carrying out clinical teaching that is traditionally centred around bedside teaching on the wards. These problems are due to changes in medical practice, for example new techniques which allow patients to be diagnosed and managed as outpatients, and in health service delivery, for example shorter stay in hospital. Some of these changes conflict with the requirements for teaching students who need time to talk to, and examine patients. The conflict between patient care and teaching has been particularly noticeable in London. This is largely related to the oversupply of large teaching hospitals in the centre of the city in contrast to the diminishing population in inner London while about a third of the country's medical students are educated in London.

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In 1989 the King's Fund Centre became interested in medical education. It had been suggested that the medical schools were acting as a brake on the development of more appropriate health services for London. An additional reason was anxiety over the likely impact of the government's health service reforms that were due to be introduced early in 1990. The Centre, therefore, responded favourably to a combined request from the City and Hackney Health Authority (one of the London District Health Authorities) and St. Bartholomew's Hospital Medical College (SBHMC), one of the London medical schools, to jointly fund a project to develop new methods of clinical teaching that would be more in line with future health service delivery.

The two-year project began in January 1990 with a review of the problems in clinical teaching. It soon became apparent that, before new ways of clinical teaching could be developed, it would be necessary to define more clearly the aims of clinical teaching for undergraduates. It was, therefore, decided to mount a national enquiry into the future of undergraduate clinical teaching to establish guidelines for the design of future undergraduate curricula in which clinical teaching would be adapted to the changing needs and circumstances of health care. By using the changes in the health service as a lever, this was seen as an opportunity to widen the scope of the project to facilitate a process of change in the whole of undergraduate medical education. The enquiry thus became part of a wider strategy to create a favourable climate of opinion and momentum for change. This paper describes the enquiry, its findings and outcome. It also analyses the success of the strategy in promoting change in medical education in the UK.

Method of the Enquiry

Agreement to proceed with the enquiry as a King's Fund Centre initiative in collaboration with St. Bartholomew's Hospital Medical College was reached early in 1990. As the aims were to develop a consensus view of the future of undergraduate clinical teaching and to create a favourable climate of opinion for such change, it was decided to use a modification of the Delphi technique, first developed in 1944 at the Rand Corporation (Delbecq et al., 1975). The Delphi Conference is a method of obtaining the collective view of a group of experts through repeated rounds of responses to a questionnaire with anonymous feedback of the responses of colleagues from previous rounds. It enables the development of a consensus view about a complex issue and ensures a certain feeling of ownership of the final product.

In Round I participants were sent a consultation document containing a series of propositions and questions on various aspects of the planning, conduct and evaluation of undergraduate teaching. In this Round they were asked to add any other issues which they thought that the enquiry should address. They were asked not to give any comments at this stage. As a result of the responses, the consultation document was amended, and additional propositions and questions were included.

In Round II the participants were invited to comment on the enlarged set of issues by agreeing or disagreeing with the propositions (with their reasons) and by giving their answers to the questions. The comments and answers were summarised in

Round III, so that the participants could see the range and degree of consensus of views which had been expressed. They were also invited to make additional comments or new suggestions in the context of the collated responses from Round II.
The propositions and questions for the first round of the Delphi conference were developed by a small group comprising people with expertise in medical education, medical academics from St. Bartholomew's Hospital Medical College and staff from the King's Fund Centre who were familiar with Delphi methods. Round I was sent out in May 1990, with a personalised covering letter from the Director of the Centre and the Dean of the Medical College.
The document was addressed to the deans and heads of major clinical departments in all 28 British medical schools, and to senior representatives of the Royal (postgraduate) Colleges. A group of 10 students and 10 pre-registration house officers (recently graduated) from each of two medical schools (St. Bartholomew's and University of Southampton) were also contacted. Reminder letters were sent out some four weeks later. Of the 344 individuals invited to participate, 213 (62%) responded to Round I.

Round II was sent out in July, again with a personalised letter signed by the Director of the Centre and the Dean of the Medical College. In order to ensure a maximum response rate, the initial deadline of October 1st was extended, and two reminder letters were sent out in mid-September and late October respectively. Responses were received from 192 (56%) of those invited to participate.

Correspondence from participants showed that there was a strong interest in having an opportunity to discuss the issues further. This reinforced the strategic plan to follow the enquiry with a one day meeting to discuss the findings.

Round III was sent out in December, along with an invitation to a one day discussion meeting for April in the following year (1991). Twenty-eight people provided additional comments at this stage, and over a hundred indicated an interest in attending the meeting.

The responses received in Rounds II and III were summarised to form the discussion document for the meeting. It presented the consensus view on the aims of a possible new curriculum and the recommendations in relation to ten sets of issues. The conference was attended by 86 participants who endorsed the findings of the enquiry and considered, in small groups, the ten sets of recommendations.

The strategy included the formation of a working party to maintain the momentum generated by the Delphi Conference and the one day meeting. Accordingly, the major areas which had been identified for immediate action were discussed by a small working party approximately one month after the meeting. Key people from the various interest areas in medical education met with a view to arriving at a plan of action. In July of the same year a definitive report was published (Towle, 1991). This consisted of a summary of the Delphi enquiry findings that had been produced for the one day meeting, together with summaries of the relevant group discussions at the meeting. In addition, the report identified the key issues which needed to be addressed if change in undergraduate medical education were to be initiated and maintained.

Process of the Enquiry

The process of the enquiry, outlined above, is illustrated in Appendix A and shows the development of one of the propositions through the different rounds of the Delphi consultation and to its eventual appearance in the final report.

Round I of the enquiry consisted of 13 propositions and 6 questions arranged in two sections: *What are the purposes of undergraduate clinical teaching?* and *How can clinical teaching achieve its aims?* The first section was further subdivided into 3 subsections: *General considerations; Overall aims;* and *Specific aims.*

In Round II, as a result of suggestions in responses to Round I, the numbers of propositions were increased from 13 to 14 and the questions were increased from 6 to 13. Additional questions about consequences for curriculum planning were posed at the end of each subsection.

Comments contributed in Round II were analysed by classifying the responses to the propositions into three groups: *agree entirely with the statement, agree but with certain reservations* and *disagree.*

In Round III, the three major arguments advanced for each of the categories were summarised, together with the number of respondents respectively. Any remaining minority comments were included in a related Appendix. Answers to the questions were classified and listed in order of priority. While the main points were summarised in the text of Round III, additional points went into the Appendix. A separate section was created to accommodate all the responses to the questions on *consequences for curriculum planning.* These summaries were grouped under the following headings: *general considerations; overall approach to planning; overall structure; content; process; organisational structure;* and *resources.*

The discussion document for the one day meeting reviewed the findings of the enquiry, in order to summarise the consensus views on the aims of a possible new undergraduate curriculum and the requirements for achieving those aims. A separate section identified recommendations for future action if the consensus were to be implemented. These recommendations were grouped into 10 themes: *aims of the curriculum; structure of the* *course; how students should learn; student assessment; student selection; the pre-registration period; where students should learn; quality of teaching; curriculum planning;* and *organisational requirements.*

Outcome

The Delphi enquiry and the one day meeting both indicated that large numbers of academics wanted to see major change in the undergraduate curriculum. The evidence also indicated that there existed a consensus view of what that change should consist of in terms of the design of a curriculum for the future. While it is not the purpose of this paper to detail the findings of the enquiry, which have been reported elsewhere (Towle, 1991), the general outcome is presented in Table I.

Table I. Summary of findings - principles which should inform the curriculum of the future

- Reduction in factual information.
- Active learning (enquiring doctors).
- Principles of medicine (core knowledge, skills and attitudes).
- Development of general competences (e.g. critical thinking, problem solving, communication, management).
- Integration (vertical and horizontal).
- Early clinical contact.
- Balance between hospital/community; curative/preventive.
- Wider aspects of health care (e.g. medico-legal/ethical issues, health economics, political aspects, medical audit).
- Interprofessional collaboration.
- Methods of learning/teaching to support aims of curriculum.
- Methods of assessment to support aims.

There was widespread agreement that present curricula are grossly overcrowded with factual information which soon becomes out of date and inhibits students from developing into creative, critical thinkers and problem solvers who are enthusiastic about continuing to learn. The comprehensive system of postgraduate education which now operates in Britain should free the undergraduate curriculum to concentrate on enabling students to develop the core knowledge, skills and attitudes which will last a professional lifetime, irrespective of the graduates' subsequent choice of specialty.

The dissemination of the findings of the enquiry came at a time when the General Medical Council (GMC) sent out to all medical schools the conclusions of its own working party in the form of a consultation paper. This document would eventually become the *Recommendations on Undergraduate Medical Education* which the GMC has a statutory duty to issue. Although the information for the enquiry and the GMC paper was collected in very different ways, there was a striking concordance in the views expressed. The GMC paper recognized that the previous Recommendations (1980) had reflected many of the views expressed in 1991, but that very little change had occurred in the intervening ten years. The GMC were thus concerned to identify now some of the barriers to change.

It was clear from discussions at the KFC's one day meeting and those of the working party that, while the enquiry had resulted in a consensus view about the changes that were required, there was a disappointing lack of ideas about how to proceed with implementation and very little understanding about the process of change.

Therefore, in the final report of the enquiry attention was paid to the management of change, to identifying the forces for and against change, the key people involved and some of the major issues which, if tackled, would greatly facilitate change (Table II).

One of the major problems in trying to take these issues forward was the lack of any key group or institution that would be in a position to take a strong lead. While deans were accountable to universities and to the GMC for the implementation of its recommendations, their collective body, the Conference of Deans was weak and unresourced. The GMC, while having a statutory role in undergraduate education had limited resources, expertise and will to push hard for reform. There was, therefore, an important continuing role for the KFC to play in keeping the momentum going and in supporting and strengthening those who could lead the way.

In the six months since the publication of the report of the enquiry, the KFC's work, the GMC document and pressure from the health service and other sources have acted and reacted together to result in a number of developments which confirm that the momentum has not only been maintained but has increased and become firmly established. The deans have agreed to set up a Council of Deans with a secretariat which will enable them to take a stronger lead in curriculum matters. The GMC has begun a series of consultative visits to all medical schools to discuss their proposals and be informed about each school's plans and problems. Many articles about medical education have appeared in the medical and health service press, thus increasing awareness of the issues and promoting the idea that change is timely and inevitable. Teaching staff in many medical schools are requesting assistance in educational matters, and the demand for staff development activities is growing. Even the seemingly intractable problem of lack of recognition for teaching is being addressed, with some deans including teaching requirements and standards into contracts for academic staff and promoting staff on the basis of excellence in teaching. Amid all these changes the KFC is continuing to play a facilitative role by creating a network for those interested in change in medical education, in order to provide a forum for discussion, exchange of information and ideas, and the sharing of good practice.

Table II. Summary of findings - action required

The following key issues must be addressed in relation to curriculum design (1-4) and to implementation of change (5-8), if major change is to occur in undergraduate medical education.

1. Definition of the core knowledge, skills and attitudes which undergraduates need to acquire in relation to what a new graduate is expected to be able to do.

2. Integration of teaching, both horizontally between clinical disciplines and vertically between preclinical (basic, behavioural and population sciences) and clinical sciences.

3. Introduction of self-directed learning, in order to encourage students to take responsibility for their own education as undergraduates and throughout their professional career.

4. Development of appropriate systems of assessment to support the aims of the curriculum.

5. Recognition for teaching, so that it is perceived as an important activity comparable in status to clinical, research and management activities.

6. Training for teachers/staff development, so that curriculum development, teaching and assessment are carried out professionally and that all staff subscribe to the aims of the curriculum.

7. Definition of where students should learn, in order to achieve the aims of the curriculum, and consideration of resource and logistical implications.

8. Management of change within medical schools to facilitate the introduction and continued development of new curricula.

Analysis of the Strategy

Since the KFC began its involvement with undergraduate medical education in January 1990, many developments have occurred, some as a direct result of the KFC's work and others because of concurrent activities and pressures. It is not possible to gauge the impact of the KFC's strategy in isolation, but it is clear that the time was right for change and that the enquiry identified, encouraged and shaped the direction of change. The basic strategy of using necessity (the inevitable changes in the health service) as a hook on which to attach the enquiry, rather than starting from a philosophical base (such as 'the role of the doctor in the 21st century') was clearly important. It demonstrated to those who might otherwise have been reluctant to acknowledge the need for curriculum reform the relevance of reviewing the fundamental aims of undergraduate education. At a later stage in the process, the consultation document from the GMC gave further confirmation that these issues were not going to go away. The similarity between this document and the findings of the Delphi enquiry increased the credibility of both and so further reinforced the direction of change.

In addition to these 'external' factors which added to the success of the strategy for change, a number of 'internal' factors can be identified which contributed to the success of the enquiry in its own right. Firstly, there is the reputation of the King's Fund Centre as an independent and knowledgeable organisation which has expertise, credibility and, it must be said, financial and other resources. Several of the participants in the enquiry commented on the need for such an organisation to interest itself in medical education, as none of the other potential leading bodies were held in high enough esteem or were perceived to be as independent. The credibility of the KFC in undertaking this work outside its normal area of operation was further enhanced by working in close collaboration with one of the medical schools. A number of participants said that they took part because of their personal respect for the dean of that medical school. It was, therefore, an important, if small part of the strategy that personal letters of invitation were sent out from both the Director of the KFC and the Dean of SBHMC.

This personal invitation, coming from respected persons and organisations, was necessary in view of the need to encourage a high rate of participation among very busy academic staff in what was a time-consuming and demanding process. The enquiry was initially viewed with scepticism by a number of those who took part somewhat reluctantly in view of the time needed to complete the various rounds. The turning point came when Round III was sent out and people could see the results of their time and effort in the comprehensiveness of the responses set out in a comprehendible fashion. Many commented at this stage that they thought Round III was a very useful document. It was evident that, even in its somewhat unwieldy form, it was already being used by chairmen of curriculum review committees and heads of departments to stimulate and focus debate. Although some participants feared that the enquiry would be just another paper and pencil exercise and were not convinced that anything would change, the determination of the KFC to continue to play a role in medical education in a non-threatening and facilitative way provided reassurance and hope.

The major disadvantage of the strategy was that it did not involve basic scientists in the process from the outset. Initially the enquiry was focused solely on clinical teaching in keeping with the original terms of reference of the KFC's involvement. Although the enquiry contained some propositions which referred to the overall aims of the undergraduate curriculum and to the integration of basic and other sciences with clinical science, those invited to participate were entirely from clinical departments. This proved to be a problem at a later stage when it became clear that the enquiry was having a wider impact than had been envisaged originally. Although ownership of the ideas emerging from the enquiry was clearly established among clinical academics, further work needed to be done to include basic scientists at this fairly late stage in the debate without further emphasizing the divide which already exists between preclinical and clinical teachers. Ways of addressing this difficulty have been sought through the deans, some of whom are basic scientists, and also through the general publicity which the enquiry has engendered, both nationally and within individual medical schools.

Conclusion

The Delphi enquiry and subsequent activities by the King's Fund Centre demonstrated the key role which an independent non-governmental organisation can play in creating a climate of opinion for change in medical education. By using changes and problems in the health service as the starting point for a review of the aims of the undergraduate curriculum, rather than a purely philosophical starting point, the need for change was made relevant, concrete and unavoidable. The independence, credibility and high standing of the facilitating organisation was another key element in the success of the strategy. The enquiry and its short-term outcome have provided a sound basis for further work by the King's Fund Centre in facilitating change in medical education, particularly in relation to the future provision of health services.

Acknowledgements

I should like to thank Professor Charles Engel, Professor Lesley Rees and Ms Barbara Stocking whose expertise and support contributed greatly to the success of the enquiry.

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Appendix

Example of the development of a proposition through the various stages of the enquiry.

Round I
(This Round asked respondents to suggest additional propositions and questions.)

Proposition:
As an essential major aim of this general medical education, a number of key competences should be developed by the time of graduation. These general competences will be essential for the entire period of professional life, irrespective of the specialty in which the graduate eventually practises. These competences will include:

- Applying the scientific method and critical thinking.
- Problem-solving, including dealing with probability and uncertainty.
- Information gathering, manipulation and storage.
- Managing self and with others.
- Communicating.
- Independent learning.

Round II
(This Round invited respondents to react to the propositions and to answer the questions.)

Proposition (Revised as a result of additions suggested by respondents in Round I):
As an essential major aim of this general medical education, a number of key competences should be developed by the time of graduation. These general competences will be essential for the entire period of professional life, irrespective of the specialty in which the graduate eventually practises. These competences will include:

- Basic clinical skills (interviewing, physical examination).
- Communication skills.
- Applying the scientific method and critical thinking.
- Problem-solving, including dealing with probability, ambiguity and uncertainty.
- Information gathering, manipulation and storage.
- Management of self and others, including proper use of available resources and working within an organisation.
- Working with others as a team.
- Interpersonal relationships.
- Independent learning.
- Adaptation to change and participation in change.

Several of these general competences are intimately dependent on a sound foundation of liberal studies.

Round III

(This Round invited respondents to comment further, now that they were presented with a survey of responses from all respondents.)

[Proposition as stated for Round II]

Agree: 123 Agree - but: 57 No comment: 2

(With representative sample responses):

Agree

- These are the basic competences which can serve a doctor for a professional lifetime and upon which specific skills and knowledge can be built during training. Such competences would place any medical graduate in a position to continue learning (it is not possible to teach a body of facts which will serve a professional lifetime), solve problems and contribute to individuals and society in general.

- These competences are fundamental if future doctors are to be able to cope with a) change and development in clinical practice and b) multiprofessional aspects of health care in which the doctor will be a team leader effectively managing resources and making the best use of services within financial constraints. The ability to accept and initiate change will be crucial.

- Besides a basis in the liberal studies, a number of these competences have to be taught in a structured setting. Medical education must provide appropriate opportunities for the achievement of these general competences by explicit consideration of their importance and relevance during clinical training.

Agree - but

The main area of contention was the final sentence ("Several of the general competences are intimately dependent on a sound foundation of liberal studies"). It provoked two sorts of comments:

- What is meant by liberal studies?

- The last sentence is a *non-sequitur*: liberal studies are not needed for development of these general competences which can easily be learned within the context of medical education.

- Some competences are more important than others: some are vital for the job (e.g. clinical skills, problem solving) some are not vital but will improve performance, some will not necessarily be practised in a future career. Competence in medicine (practical skills) should have priority over all other considerations. Some of these competences are more effectively learned while practising and are therefore more appropriate for the postgraduate than undergraduate period.

- Some competences are dependent on personality/character/upbringing/life experiences and cannot be taught. It is therefore important to select students carefully.

Discussion Document/Final Report

Undergraduate education should provide appropriate settings for the acquisition of a number of key competences which will be required throughout a professional lifetime, irrespective of which specialty is practised. The competences will enable future doctors to cope with change and developments in clinical practice (by adapting to and participating in change) and with their wider responsibilities (e.g. as team leader, manager of resources).

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PROBLEM-BASED LEARNING

Materials for Problem-Based Learning Sessions. The Faculty of Medicine, University of Limburg

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Abstract

This paper gives a short overview of the structure of the curriculum of the medical school in Maastricht, the Netherlands. The learning activities of the students in the first four years of the curriculum are especially stressed and some examples of tasks used for small group sessions are shown.

Introduction

Since its establishment in 1974 the Medical School at Maastricht has adopted a problem-based learning curriculum. It consists of a six year programme, including two years of clinical and primary care rotations. Although numerous changes have been introduced in the management of education, the format of the learning units, the design of the curriculum, the format of the tasks, etc., the basic philosophy of problem-based learning has never been challenged. A short overview of the current "state of the art" and some examples of the materials used in problem-based learning sessions are reported here.

The General Concept

The learning process in the first four years of the curriculum is centred around small group sessions. A two-hour group session is held twice a week with 8 to 10 students under the guidance of a Faculty tutor. They analyse and discuss tasks and problems related to a specific theme. The aspects that are associated with the theme originate from different disciplines. A theme covers a period of six weeks (with some units of four weeks to accommodate the fixed length of an academic year). During these blocks or units several other learning activities are organised such as skills training, practicals, lectures, practical medical training in health care settings. All these activities are related to the theme of the block and support the learning activities in the group sessions.

Self-directed learning is an important element in the Maastricht problem-based programme. Therefore, the time scheduled for programmed activities is carefully limited, so that self-study time is available for the students. As a rule of thumb not more than about 20 hours a week are devoted to scheduled activities.

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For each block-period a block book is compiled. The content of a block book has a fixed structure:

- A general introduction which elucidates the block theme and justifies the activities and subjects chosen for tasks and problems. The relationship of the block to other blocks is clarified, and the global objectives are described.
- A timetable in which each activity is explained.
- The tasks and problems to be used in the small-group sessions, approximately twelve in each block.
- A list of references to the literature related to the theme, and a list of other relevant learning-resources.
- Self-assessment-questions.

A fixed number of nine different disciplines are linked to each block theme. Five members of these disciplines form, within a rotation scheme, a group that plans and manages the block: the planning-group. From each of the nine disciplines two tutors are provided to guide the tutorial group sessions. There are about 150 students in each year of the programme, so that 18 small groups work simultaneously on the same tasks and problems. For each block the students and tutors are randomly assigned to their groups.

The themes of the blocks in the first four years of the curriculum are set out in Table I.

The Small Group Session

With the exception of the first and the last session in a block, two tasks or problems are addressed in a single session. The session starts with a presentation and discussion of the outcome of the individual learning activities that resulted from the previous session. Any outstanding questions are explained as far as possible, and the task from the previous session is completed. A new task is then addressed and systematically worked through, until the group is able to define learning objectives for individual study in preparation for the first part of the next session.
This systematic approach consists of the "seven jump" (Schmidt, 1983), and this seven step procedure is outlined in key words in Table II.

The most important task of the tutor is to facilitate the learning process of the students. This implies that the tutor actively fosters the group's interactions and discussion and interferes only when strictly necessary. Each student in rotation acts as discussion leader. For each session one student is appointed to record the discussion on the blackboard or on a flipchart.

The Format of the PBL Material

All the tasks and problems that are used as learning material in the small group sessions are included in the block book. The average problem requires less than half a page of print. For a particular problem the students are provided with sufficient information to arouse their interest and to motivate them to obtain more information and knowledge to understand the background and the several aspects related to the problem. Sometimes the tutor is required to supply more information (for example, the results of a laboratory test).

Table II. The seven jump approach

Step 1:	Clarifying whatever is not clear in the task.
Step 2:	Defining the problem.
Step 3:	Analysing the problem.
Step 4:	Listing possible explanations.
Step 5:	Formulating learning objectives.
Step 6:	Looking for additional information between group sessions.
Step 7:	Reporting back at the next tutorial group session.

In most blocks the tutors have a tutor-guide. The educational objectives of each task are described in the guide, and questions are suggested that can be used to stimulate in depth discussion of the problem. Supplementary information, e.g. about a patient, may also be provided.

The use of printed tasks in block books implies that the tasks are known to the students before the group sessions. However they have no information about the tutor guide. In the daily practice of the learning process students hardly ever study in advance. Perhaps this is the result of the way they are trained to work in a problem-based learning setting, but more likely this attitude is related to the fact that they are not assessed during the small group sessions.

There is a difference between the tasks in the first two years and the third and fourth year of the curriculum. In the first two years a phenomenon or limited problem is the dominating task: a brief description of an event without referring to actual patients, their background or case history. In the following two years the problem of a real patient is the dominant task. An example of each type of task, together with its tutor guide is set out below.

Table I. Curriculum of the Maastricht Medical School, 1991/1992

Year 1	INTRO	Introduction to medical studies 1.1	Metabolism 1.2	Interaction and regulation 1.3	Attack and defense 1.4	Balance / imbalance 1.5	Care for health 1.6
Year 2	Perception, consciousness and emotion 2.1	Locomotion 2.2	(Electives) 2.3	Fundamentals of scientific research* 2.4	Growth and differentiation 2.5	Born and raised 2.6	Ageing 2.7
Year 3	Shortness of breath and chest pain 3.1	Inabilities 3.2	Mental and behavioural problems 3.3	Appearance and external manifestations of disease* 3.4	Pain 3.5	(Electives) 3.6	(Electives) 3.7
Year 4	Problems of reproduction and sexuality 4.1	Abdominal complaints 4.2	Fever, infections and inflammation 4.3	(Electives) 4.4	Blood loss 4.5	Fatigue and weight loss 4.6	Emergencies* 4.7

* instead of 6 weeks, these units are 4 weeks in length

A task from "Locomotion", second block, Year 2

Respiratory Control

Situation 1
A group of youngsters try to swim as far as possible under water. Harry can cross the pool twice (25 m length), and now Henk attempts to excel Harry's performance. In order to increase the breathholding time he hyperventilates until he feels a little dizzy and then dives. He crosses the pool twice and makes a turn for his third lap. Half way through the third lap he suddenly stops swimming. Air bubbles reach the surface. Arno immediately dives into the water and brings Henk to the side. Henk is unconscious, has stopped breathing and his heart rate is 98/min. Arno starts mouth to mouth resuscitation. After about one minute Henk starts to breath again and regains consciousness. His first question is: "What happened, and did I break the record?"

Situation 2
A 67-year old, dyspnoeic patient with chronic respiratory insufficiency is admitted to the hospital. The arterial pCO_2 is 8.6 kPa, the O_2 saturation 70%, and the pH 7.28. The doctor administers oxygen at a rate of 2 liters per minute. The ventilation and the dyspnoea decrease, the arterial O_2 saturation drops to 65%, the pCO_2 is 8.9 kPa and the pH is 7.18. The doctor wonders why the patient's condition is deteriorating.

Tutor Guide

The two cases describe two situations in which respiratory control plays an important role. After completion of this task the students should be able to explain what happens and should also explain the clinical findings. The control of respiration should be studied (peripheral and central chemoreceptors, respiratory centres and respiratory control).
In Case 1 the hyperventilation decreases pCO_2, but fails to increase pO_2. During underwater swimming the decrease of pO_2 may induce unconsciousness before the pCO2 stimulates breathing.
In Case 2 the patient's ventilation decreases because of CO_2 intoxication, and lack of respiratory stimulation by too high an O_2 delivery.

A task from "Abdominal Complaints", second block, Year 4

Mr. Smeets is 47 years old and has been a truck driver for the past 17 years. He used to work shifts, but stopped doing so when he developed a gastric ulcer. At present he works during the day, still smokes a lot and comes to his GP for stomach tablets at least 2 or 3 times a year.

Last week he was suddenly told to take a load to southern Germany. On the autobahn, half an hour after lunch, he developed severe abdominal pain. He just managed to reach a service area, where he had to vomit and where he began to transpire profusely. He rested for an hour and took two tablets of acetyl salicylic acid for the pain, because he had forgotten his stomach tablets. When he arrived at the hotel in Munich, he had to vomit once more. In the vomit he saw a bit of blood. He became alarmed, and took a taxi to the casualty department of the St. Franziskus Hospital. Following emergency endoscopy, the attending specialist told him he would probably need to have a stomach operation in the near future.

Tutor Guide

This task gives an example of a patient with an ulcer. Some causative factors should be discussed: stress, smoking, irregular meals, self medication with ASA.
The ignorance of the patient regarding the danger of this medication for people with ulcers is to be stressed.
This patient is an example of two possible complications: penetration/perforation and haemorrhage. The specialist who performed the endoscopy indicates a third complication: the danger of stenosis at the pyloric portion of the stomach.
The choice between endoscopy and radiology for the diagnostic process in cases of diseases of the stomach are to be discussed.
Regarding the therapy for this patient, the differences between intermittent ulcer treatment, maintenance treatment and surgical alternatives (elective resection of the stomach and/or vagotomy) are to be discussed.
The discussion about the role of the eradication of Heliobacter pylori is optional.

In the first task respiratory control is the key issue, and students are not supposed to discuss patient management. It is, therefore, important that the task is constructed in such a way that the students are not tempted to do so nevertheless. In the second example in the block "Abdominal Complaints", patient management is the most important issue, together with the pathophysiological aspects of this task. In this type of task it is important that the students do not jump to conclusions by considering the task as completed when they have determined the diagnosis. Dealing with patient problems, the SOAP approach (what are the Subjective elements we want to know about the patient, which Objective data are to be collected, how do we Evaluate the information we have, and what is the next Plan?) dominates over the "seven jump approach". However many groups intertwine elements of the seven jump approach with the discussion when pathophysiological topics are addressed.
Materials other than the written information provided in the block book are seldom used. Sometimes a radiograph is made available for each of the groups. Occasionally, students are given the opportunity to see a video tape of a patient similar to the one presented in the problem.

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Learning Issues Identified using Standardised Patients in a Problem-Based Learning Course

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Abstract

The University of Calgary has a three year problem-based medical curriculum. Prior to starting the third year, students participate in a four week Integrative Course (IC). This course allows students to develop skills in counselling and managing multidisciplinary problems. In previous years, the IC has used patient management problems in computer and booklet formats. This year, eight professionally trained Standardised Patients (SP) were introduced to develop students' communication skills. This enabled the authors to study the nature of Learning Issues (LI) identified by the students. During the pre-course orientation, preceptors were instructed to record all LI identified by the students. These LI were then analysed by content area, learning category, and by resources used. Most LI concerned simple knowledge issues, most frequently pathophysiology, and these were resolved from textbooks. When comparing students' LI with those of the case authors, groups of students identified an average of 38% of LI overall. When LI were divided into categories of basic science, diagnosis, pathophysiology, and management and counselling, students identified 42% of case authors' management and counselling issues.

Introduction

The University of Calgary Faculty of Medicine has a three year undergraduate curriculum. The first two years are composed of two parallel tracks. The first track comprises a series of body systems- based courses, for example, the respiratory and cardiovascular systems. The second track, the Continuity Courses, focuses on skills and attitudes, and includes, for example, courses in human growth and development. The final year is a clinically based clerkship. The overall layout of the curriculum and the position of the Integrative Course is shown in Figure 1.

There is considerable variation from course to course in the method of teaching. Overall, twenty per cent of the curriculum is in the format of Problem-Based Learning (PBL); thirty-five per cent is traditional small group tutorials; and the remaining fourty-five per cent is lecture format.

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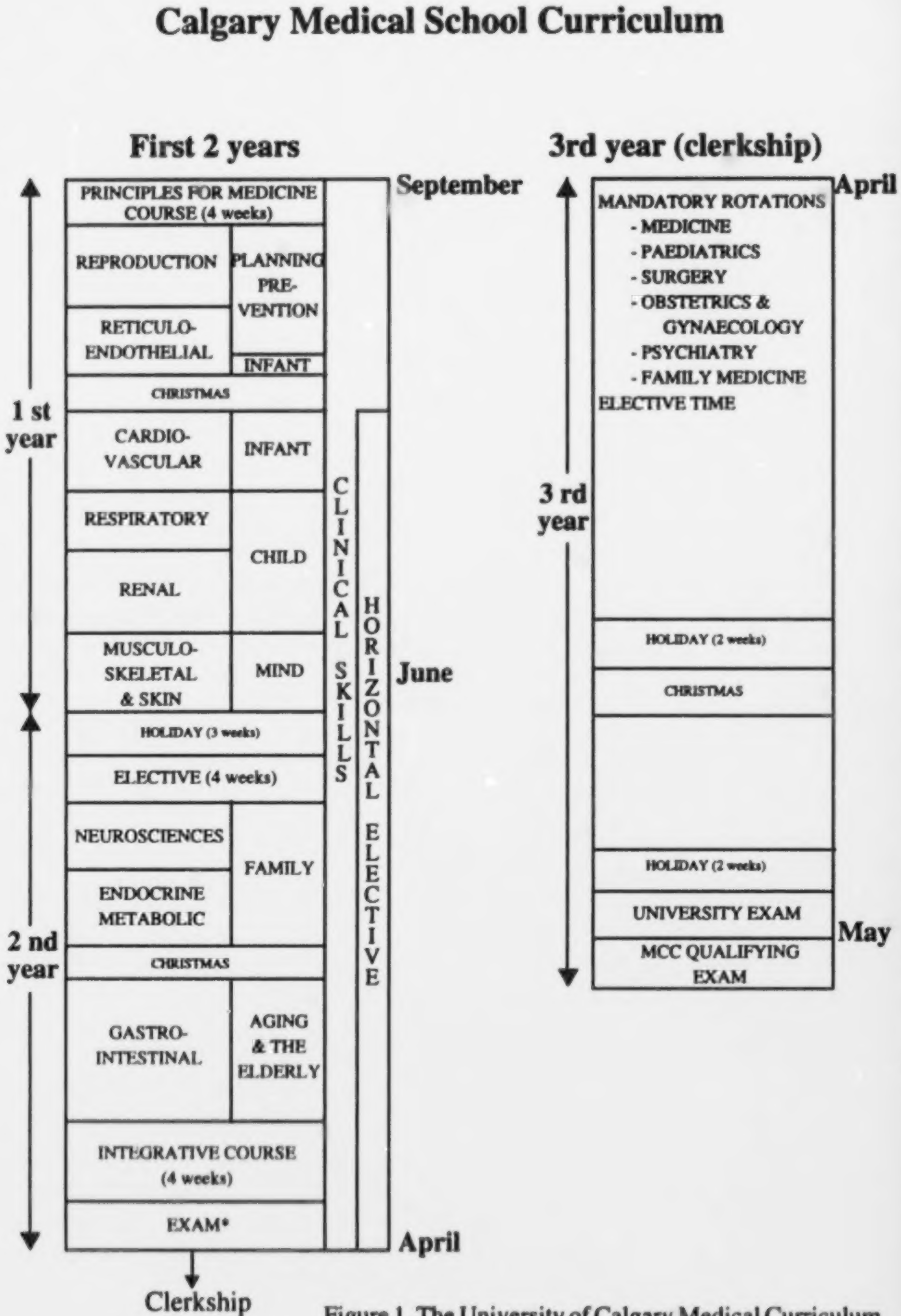
Calgary Medical School Curriculum
First 2 years
3rd year (clerkship)
PRINCIPLES FOR MEDICINE COURSE (4 weeks)
REPRODUCTION
PLANNING PRE-VENTION
RETICULO-ENDOTHELIAL
INFANT
CHRISTMAS
CARDIO-VASCULAR
INFANT
RESPIRATORY
CHILD
RENAL
MUSCULO-SKELETAL & SKIN
MIND
HOLIDAY (3 weeks)
ELECTIVE (4 weeks)
NEUROSCIENCES
FAMILY
ENDOCRINE METABOLIC
CHRISTMAS
GASTRO-INTESTINAL
AGING & THE ELDERLY
INTEGRATIVE COURSE (4 weeks)
EXAM*
CLINICAL SKILLS
HORIZONTAL ELECTIVE
September
June
April
1 st year
2 nd year
Clerkship
MANDATORY ROTATIONS
- MEDICINE
- PAEDIATRICS
- SURGERY
- OBSTETRICS & GYNAECOLOGY
- PSYCHIATRY
- FAMILY MEDICINE
ELECTIVE TIME
HOLIDAY (2 weeks)
CHRISTMAS
HOLIDAY (2 weeks)
UNIVERSITY EXAM
MCC QUALIFYING EXAM
3 rd year
April
May

Figure 1. The University of Calgary Medical Curriculum

Students encounter PBL in the first weeks of the curriculum and recurrently into the clerkship. PBL at the University of Calgary follows the approach described by Schmidt (1983). Students, in groups of seven or eight, are presented with common clinical problems which they are expected to probe to the extent of their ability. The tutor's role is to facilitate group process, challenge the student to exert their maximum effort, and to help identify key learning issues.

The Integrative Course (IC) was developed eight years ago to help students improve their skills in dealing with multidisciplinary problems. During this four week problem-based course, which occurs immediately before the clerkship, preceptors meet with students daily for two to three hours. The course uses a number of ill-defined problems of various formats including book and computer based scenarios, and real and standardised patients (Barrows, 1987).

This course has three, equally important, overall objectives: a) to develop clinical problem-solving skills (including history taking and physical examination); b) to improve communication skills by exposure to problems which raise counselling issues; and c) to foster judicious use of resources. Counselling issues are a subtype of learning issues whose key feature is the process of communication, for example, how best to express key ideas or attitudes to a patient or coworker.

In their orientation session and course documentation, the students are encouraged to explore the difficult issues posed by these patients. Many of the issues, for example death and dying and alcoholism, have been met in earlier parts of the curriculum during the Continuity Courses. In the Integrative Course, the students are encouraged to explore these problems in an interactive fashion with standardised patients.

The tutors in this course are from a variety of medical backgrounds and are an equal mix of generalists and specialists. All have extensive experience in PBL, and most have been involved in the course for several years. Because the students have completed their final systems based course (Fig. 1), the tutors are instructed not to emphasize pathophysiology, but to encourage their groups to explore the deeper social, counselling and management issues.

Over the years, the IC Committee had noted that the emphasis of the course had become weighted toward clinical problem-solving. In order to reemphasize management and counselling, eight new standardised patients were introduced. These were based on actual clinical cases and were developed by a case author (a physician) and a professional actor trainer. Table I shows that these cases were frequently multidisciplinary in nature and offered many potential counselling opportunities and complex management and counselling issues.

The course committee wished to monitor how students would employ these new cases, and whether Learning Issues (LI) could provide useful information about the use of these cases.

Table I. Standardised patients

Case	Initials	Subject Matter
1.	T.B.	Poorly controlled diabetic who wishes to become pregnant
2.	A.C.	Patient with severely injured leg who refuses amputation
3.	L.C.	Immigrant woman with dysfunctional uterine bleeding who is concerned about the marital consequences of hysterectomy
4.	J.G.	Terminal care of a patient with metastatic melanoma
5.	E.H.	A patient with unstable angina and lung cancer
6.	L.C.	A patient with neurological deficits following a subarachnoid haemorrhage
7.	G.W.	Alcoholism and hepatitis in a health care worker
8.	J.S.	Adolescent with seizures, hyponatraemia, and anorexia nervosa

Methods

Prior to starting the course, a tutor guidebook was constructed which listed the case author's LI and the anticipated flow of the case. Meetings were held with the tutors to inform them of the changes in the course and to solicit their opinions about the appropriateness of the management and counselling issues. Prior to the course, each standardised patient was reviewed by the case author and a senior resident to evaluate the accuracy and realism of the portrayal. In two cases substantial changes were made to the standardised patient following this review. During the course, consistency of portrayal by the actors was tested by repeated, daily observation by the trainer and the course organisers. Informal discussions were held daily with the tutors about the actors' performance. Most of the actors had at least some theatrical training and all were working part-time in professional theatre.

Case tutors were instructed to record all the LI identified by the students. The students were asked to identify LI whenever they felt more information was required to counsel the patient or to manage the particular situation. This was not limited to the student dealing with the patient. In most instances, LI were recorded after group discussion which helped to define further the specific problem. Most of the sessions were also videotaped for subsequent review.

The tutors were also asked to record the nature of the learning resources which the students used when they attempted to resolve specific LI. These resources included faculty members, texts, journals, computers, other library facilities, and outside agencies. When several students in a group used the same type of resource, for example textbooks, this was identified as a single learning resource.

These LI were then analysed by content, by type of learning resource used, and by learning category. The details of this scheme are shown in Figure 2. The LI were also compared with those developed by the case author for each category, and for management and counselling specifically.

There were 12 groups of students, and a total of 18 tutors. Six tutors remained with their groups for the full four week block. The remaining tutors spent two weeks with their respective group.

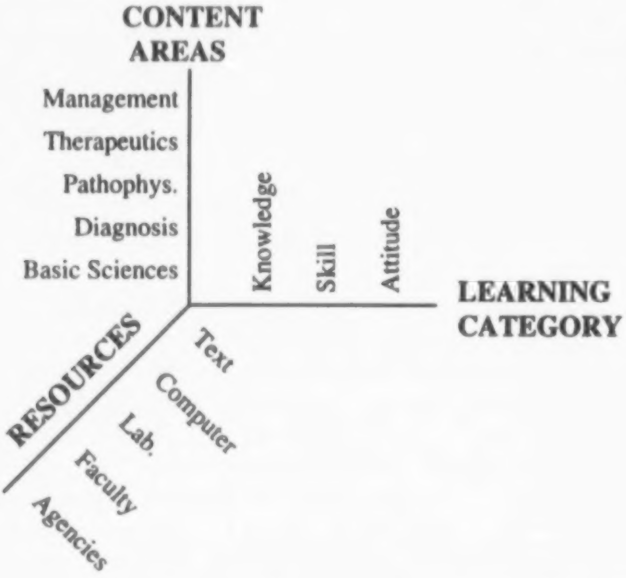
CONTENT
AREAS
Management
Therapeutics
Pathophys.
Diagnosis
Basic Sciences
Knowledge
Skill
Attitude
LEARNING
CATEGORY
RESOURCES
Text
Computer
Lab.
Faculty
Agencies

Figure 2. Classification of learning issues

Results

A total of 288 LI were compiled from 33 sessions with standardised patients. Typical data are shown in Table II. The percentage distribution of these learning issues, analysed by content area, learning category, and learning resources used, are displayed in Figures 3 to 5. An example of a LI related to pathophysiology was: "How does hypothermia predispose to cardiac dysrhythmias?" From the same case, a management or counselling LI was: "How can informed consent be obtained for surgery, when the patient is hypothermic?" When the students' LI are compared to those of the case authors, the groups of students identified an average 38% of the LI overall, and 42% of the management and counselling issues.

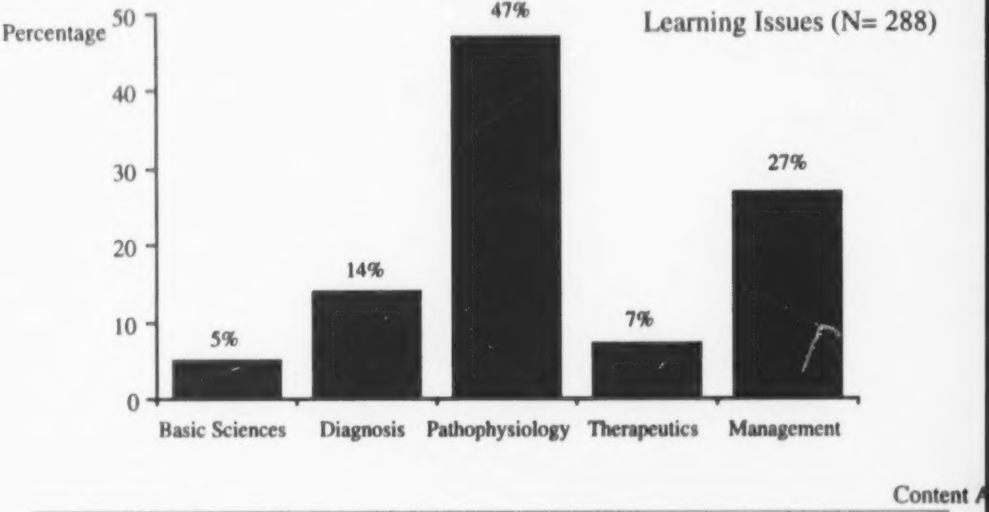

Figure 3. Categorisation of learning issues by content area

The method used by the groups of students to identify LI was not studied specifically, but from direct observation and review of videotapes, it was apparent that potential issues were identified by one student or simultaneously by several students. This was followed by group discussion about the topic, and if agreement was reached within the group, it would be recorded as a LI. Most frequently, the tutor was involved only in the later stages of the process.

In general, students identified fewer LI than planned by the case authors and rarely identified issues that were not included in the authors' lists. As can be seen from Table II, there was variation between groups in the number of LI identified. There was a consistent tendency for students to identify primarily "knowledge"-related topics. This tendency reflects the distribution of the case author's LI (Table II).

Table II. Distribution of learning issues for 3 of the cases

		TYPE OF ISSUE		LEARNING RESOURCES		TAXONOMY		
Case	Group Number	Management or Counselling	Pathophysiology, Therapeutics, etc.	Library	Faculty or Agencies	Knowledge	Skill	Attitude
AC	2	2	4	4	2	5		1
AC	9	0	3			3		
AC	10	1	5	5	1	5	1	
AC	11	2	11	2	9	13		
Identified by author		3	17			18	2	
GW	7	1	5	5	0	5	1	
GW	8	2	6	6	0	7	1	
GW	10	4	5			9		
GW	11	2	5	7	4	7		
Identified by author		4	9			10	2	1
JS	5	3	3			6		
JS	7	2	6	8	6	8		
JS	10	0	9	9		9		
JS	11	0	2			2		
Identified by author		6	12			15	1	2

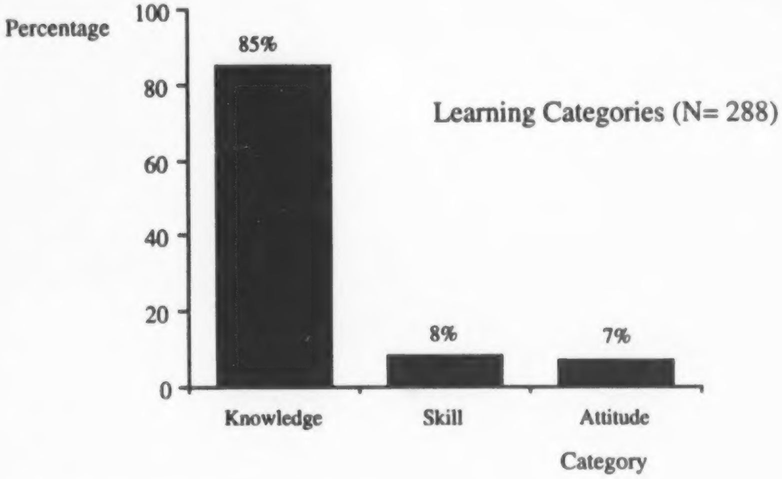

Figure 4. Analysis of learning issues by category of learning

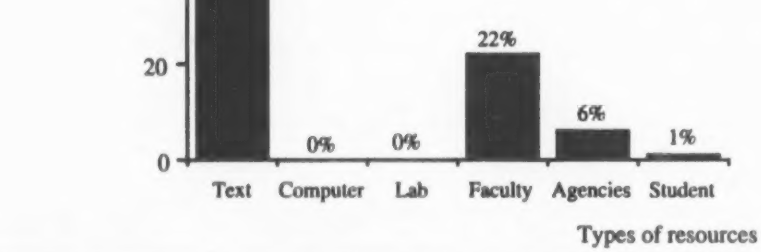

Figure 5. Resources used in the resolution of learning issues

Some difficulties were noted in associating a specific LI with the corresponding LI of the author or between LI generated by different groups of students. Differences in terminology or the detail of recording could result in potential variation in the assignment of a particular LI to a given content area or learning category. For the majority of recorded LI, this was not a problem, but a greater potential for misassignment was felt to exist when recorded LI were extremely terse.

There was a consistent pattern in the use of textbooks to answer questions related to pathophysiology and in the use of teachers for questions related to management and counselling (Fig. 5). Students occasionally used multiple approaches to answer a single LI; for example, one student would attempt to answer a question from a book, a second would use a Faculty member, and a third would consult an outside agency. The first part of the group's next meeting would be spent synthesizing this information.

Only one significant problem was noted in the consistency of portrayal by the actors. This was resolved by changing an actor. At the debriefing of the tutors, no further problems were noted with the performance of the actors.

Discussion

It is apparent from this and other studies that the examination of documented LI can provide useful information about the content of learning sessions when standardised patients are used (Coulson, 1984; Shahabudin, 1987). Course managers can identify how students spend their time; which key issues are, or are not noted or discussed; and which learning objectives are addressed. For example, at their debriefing tutors noted a general weakness in students' physical examination skills as reflected in the lists of LI (Fig. 4). This information has led to greater emphasis on physical examination in the tutor guide book.

An objective of the course committee was to increase the emphasis on management and counselling. Management comprised the second largest group of identified LI (Fig. 3). Since objective information from previous courses was not available, the authors could not demonstrate any change in the number of management LI. However, the opinions expressed by preceptors at the debriefing suggested that an increase in this type of LI had occurred. Most LI were based on pathophysiology. As these students had previously completed their systems based courses, the emphasis on pathophysiology was interesting and may lead to further exploration. The end-of-course questionnaire revealed that many students used this course to review concepts from the system based courses.

Although textbooks were the most commonly used learning resource, students used Faculty staff for almost one quarter of all learning issues. This practice was encouraged by the course committee. Resource persons were identified in the preceptors' case guidebook and were familiar with the relevant cases and objectives of this course. While one objective of the course committee was to encourage students to contact outside agencies (for example, Alcoholics Anonymous), this was found to be an infrequent occurrence and indicated the need for further development. The use of computer or laboratory facilities was not actively encouraged or discouraged. These resources were not specifically identified in the tutor guidebook.

When viewed from the perspective of categories of learning, most LI were concerned with simple acquisition of knowledge. Very few LI were directed toward development of attitudes or skills, a deficiency which will be addressed by the course committee.

The relatively low percentage of the case authors' LI that were identified by the students, requires clarification. The LI lists compiled by case authors are exhaustive and contain many issues already identified in the objectives of the previous systems based courses. Tutors used the authors' lists as guidelines, but did not expect that all issues would be identified. In attempting to change this course, more specific training of the preceptors may have resulted in greater attention to the management and counselling issues. Preceptors were led through each case by the author in the orientation session with ample opportunity for discussion. A more interactive training session that would allow the preceptors the opportunity to work with the standardised patients directly, may prove to be more effective.

Conclusion

In reviewing these PBL sessions, it was apparent that the review of LI is an extremely time efficient technique for course administrators, compared with direct observation and videotape analysis. Large numbers of sessions can be reviewed rapidly, and additional information can be obtained about work done by students in their own time.

However, some limitations became apparent. Recorded LI reflect neither the time spent by the group on a particular issue, nor those issues that had been resolved within the group. Direct observation and review of sessions on videotape indicated that considerable discussion of management problems may occur within the group without generating a single recorded learning issue. By contrast, items related to pathophysiology tend to be recorded quickly with smooth transition by the group to the next area of interest. This is a significant limitation in the use of LI for assessment of group activity. A further limitation was the occasional difficulty encountered in associating a specific LI with those generated by the case author, due to differences in terminology or the relative accuracy and completeness of the recorded LI. This may hinder identification of a group's actual activity or point of interest.

We conclude that the review of learning issues that are identified while working with standardised patients can provide useful information for course managers, but the method has significant limitations.

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Some Aspects of Skills Training and Problem-Solving in the Medical Faculty, Diponegoro University

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Abstract

The paper outlines an introductory course to clinical medicine which is presented over a period of eight weeks between the preclinical and clinical components of the undergraduate curriculum. Emphasis is placed on practice through role play among students. The use of a number of methods for learning and assessment is included in the paper.

Introduction

The introductory course to the General Clerkship links the theory and practice of medicine. It was felt that new clinical students were inadequately equiped to benefit from the clinical setting. There was also a need to bridge the change from theory to practice and from knowledge orientation to problem orientation in their learning. In addition, this course was to avoid overlap of introductory activities by various clinical departments. The course aims to provide training in basic medical skills, including obtaining data in history taking, physical examination and routine laboratory examiniation. It is also designed to refresh the students' knowledge and to make this knowledge applicable to medical practice (applying the process of problem-solving). The course comes after the first four mainly theoretical years and before the two year clerckship (Fig. 1).

1st - 7th semester Mainly theoretical knowledge	8th semester Introduction to Clinical Clerkship	9th-12th semester Clerkship

Figure 1. Sequence in the curriculum

The duration of this course is eight weeks and is designed as small-group tutorials for groups of 12 students (Tim Panum, 1989). The tutor guides each student and and assesses achievement of the goals. The tutors are trained in a special two week course. They are recruited from preclinical, paraclinical and clinical departments.

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History Taking

1. The student is able to perform medical history taking and master interpersonal communication aspects adequately.
2. The student is familiar with emotional reactions and resistance of a patient.

History taking is practised in role-play sessions with emphasis on communication as well as medical aspects. Special videotapes have been developed to demonstrate problems in doctor-patient communication for study before role-playing excercises are undertaken. At first, a list of topics is given to the students one week before the role-playing. These topics represent chief complaints to be used in the role-play. Each group of 12 students is supplied with 12 chief complaints, one for each student:

1. Coughing
2. Headache
3. Chest pain
4. Abdominal pain
5. Diarrhoea
6. Back pain
7. Haemoptisis
8. Haematemesis
9. Fever
10. Weight loss
11. Bleeding
12. Dyspnoea

These are prominent chief complaints in rural and urban primary health care (PHC) in Central Java. Each student acts as phycisian as well as patient but with a different topic, so that every student has the same experience of skills training in history taking. During the role-playing sessions discussions are tape-recorded as evidence during discussion among the students. At the end of a session the tutor comments and offers suggestions on medical as well as communication aspects.

Physical Examination

1. The student is able to execute the routine physical examination.
2. The student is aware of the significance of undergoing and executing physical examination.

At first students browse through videotapes of physical examination, prepared by our Audiovisual Division. The students will then practise physical examination in pairs, one acting as the doctor and the other as the patient alternately, guided and supervised by the tutor.

For sociocultural, ethical and religious reasons, male and female students are trained in separate rooms. To strengthen the students' experience in the diagnostic process and its strategies (Djokomoeljanto, 1989), we show them a series of specific clinical pictures on slides and videotape.

Routine Laboratory Examination

1. The student is able to perform routine laboratory examinations in preparation for his activities on the ward.
2. The student is aware of the significance of undergoing and performing laboratory examinations.

In this session students are trained in performing routine laboratory examinations through practice with each other, preceded by discussions that are guided by the tutor.

Medical Problem-Solving

The term "medical problem-solving" is most often used to refer to that process by which physicians arrive at a diagnosis, select a management strategy, initiate remedial action, monitor its effectiveness, and modify their interventions accordingly. The situation in which this process may be used ranges from the problems of individual patients to community or national health problems (Kuyken et al., 1988).

We use several methods to introduce medical problem solving:

1. Modified essay questions (MEQs)
2. Pharmacotherapy
3. Problem-oriented medical record (POMR).

Modified Essay Questions (MEQs)

We select three kinds of written simulation for problem-solving exercises. These are Problem Box, Patient Management Problem and MEQ. An MEQ is a case history, as it was obtained in practice. Information is provided in a sequential manner. The technique is in effect a series of open-ended questions about a developing situation in which the responses at each stage are relatively free. The students have to construct their own responses. On the next page of the MEQ, new information is given to continue the case (Feletti et al., 1980). In this developing situation of a given case, questions can be devised to explore important factors influencing decision making and attitudes, thereby gaining insight into the students' behaviour. Also some of the thinking processes leading to these actions can be demonstrated (Verwijnen et al., 1989).

We have prepared more than 30 MEQs for use in medical problem-solving skills training. They have been designed by the Division of Problem-Solving in the Introductory Course team. Topics of MEQs are selected by considering prevalence in general practice. MEQs are discussed in small groups, guided by a tutor.

Pharmacotherapy

From the clinical situation, the student is able to reach a justified choice of drug therapy. The student refreshes his/her knowledge of therapeutics and pays attention to important interactions. The application of pharmacotherapy is here practised through the solving of written simulated patients in MEQs, but with emphasis only on pharmacotherapy.

Problem-Oriented Medical Record (POMR)

The student can demonstrate the relative significance of the essential problems that have been registered. The student is able to reproduce the principles of the S-O-A-P (Subjective-Objective-Assessment-Plan) system as the major framework of POMR (Imam-Parsoedi et al., 1988; Petrie et al., 1979). POMR training is implemented in small-group tutorials, by producing and filling in the POMR, followed by discussion.

Other Clinical Skills

Several clinical skills are practised during the Introductory Course, including cardiopulmonary resuscitation, first aid and nursing.

Assessment of Students

Several kinds of tests are used, but mainly the Objective Structured Clinical Examination (OSCE). Here the students rotate through stations where they are required to perform a variety of tasks (Harden et al., 1979). They may be asked to perform a neurological examination of the lower extremities, an abdominal examination, etc. Their performance is rated by tutors on standardised checklists.

Evaluation

Experience over a period of three years has demonstrated:

1. Improved clinical performance, especially in clinical skills and problem-solving.
2. A more effective and efficient curriculum, because overlap in basic clinical training by separate clinical departments has been reduced.
3. Better cooperation among the teaching staff from different departments, because they are closely involved in the planning and conduct of the Introductory Course.

Conclusions

The Course provides an Implementation Team that supports the Dean in the implementation of the curriculum, and a Research and Development team which has to develop further the contents, methods, strategy and evaluation of the Course. The Course has demontrated the advantages of applying the problem-based learning principles. We are of the opinion that we will achieve more if more problem-based learning activities can be implemented in our medical education.

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ADMINISTRATION OF EDUCATION

A Field Experiment on Admission to Medical Education at Linköping University

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Abstract

The paper describes an individualised admission procedure to medical education at the Faculty of Health Sciences, Linköping University. The main goal for the procedure is to admit students who will be successful in a problem-based learning course and who can be expected to become good professionals. The admission procedure consists of three steps. Step I is the conventional ranking of applicants, based on marks from upper secondary school or on the university standard aptitude test. Step II consists of three tasks: written explanation of motivation, structured personal life description and an essay. Step III consists of an interview conducted by a pair of interviewers, one layman and one academic practitioner. Figures from two admissions showed acceptable reliability in Step II and very good reliability in Step III. An inquiry among applicants revealed good confidence in the competence of the interviewers. The procedure will be used for three years and it will be evaluated both on a short-term and a long-term basis with regard to reliability and validity of the admission instruments.

Introduction

The Medical Faculty at Linköping University was established in 1970. Until 1986 its medical students spent their first two (preclinical) years at the University of Uppsala and the last 3.5 years in Linköping. The entire study programme was a conventional medical curriculum. From the Autumn 1986 the Faculty of Health Sciences was established with curricula for six different health professions. Problem-based learning (PBL) was adopted as a common educational principle. In the medical curriculum training in patient communication and examination starts in the very first semester. Multiprofessional education (MPE) for the six health curricula is introduced during the first ten weeks and intermittently thereafter. Other key-concepts are preventive medicine and primary care . The first medical students in the new curriculum graduated in January 1992.

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Admission to all full-length study programmes at university level is centralised in Sweden. A special unit at the National Board of Universities and Colleges deals with admission. Students who wish to apply to any or all six medical schools address themselves to that board. Applicants have to declare an order of priority. The criteria for admission vary, but the main discriminant is grades from secondary school or marks from a university standard aptitude test (USAT). Everyone above school-age can take the test. With effect from 1991 every second and third year student in upper secondary school can also take this test and use it as an alternative to their school grades. At present 60% of the students are admitted to medical schools on their school grades and 40% on their USAT marks. The academic year in Sweden has two semesters, and new students are admitted twice a year.

When the new curriculum was first was designed in Linköping, a more individual admission system was included in order to admit students with a favourable prognosis in the completely new curriculum. The proposal was repeated by the Faculty of Health Sciences but was rejected by the Government, mainly because of the methods that had been suggested. Interviews were not looked upon as a "scientifically proven tool, adequate for university admission".
However, from 1990 onwards the political climate became more favourable for local initiatives in university admission. A new proposal from Linköping was now approved. The proposal encompassed a three year experiment with an individualised admission system for the educational programmes for physiotherapists and medical doctors, to be followed by extensive evaluation.

This paper describes the principles of the individualised admission system for the medical programme and our experiences after two admissions.

Reasons for the New Admissions Procedure in Linköping

Medical education in Sweden attracts many applicants. Very few are accepted into a medical school. Almost all are academically among the best in their age-group. The problem is not to find the brightest students, but to find the students who are most likely to be successful in their studies and in the profession.

When students enter the educational system at the Faculty of Health Sciences in Linköping they meet something that is quite new for most of them. It is, therefore, very important that no one should enter the course without being fully aware of what is involved.

The main goal for the selection is thus to identify students who are:
* well informed about the study system in Linköping;
* successful in an unconventional curriculum with e.g. problem-based learning (PBL) and multiprofessional education MPE; and
* expected to become good professionals.

Overall Design of the Experiment

The experiment will last for three years with careful follow-up of different effects. During the three years there will be six admissions. Two have already been completed. On each occasion half of the students to be admitted will be selected by the local procedure.The other half will be chosen by the central authority according to normal procedure. The treatment variable is here the different admission system. The first group consists of approximately 18 students per semester, but this will increase to 23 per semester from Autumn 1992. The same numbers apply for the second group, the control group in the experiment. The effect variables are related to success or failure for the different groups on the goals stated for the local admission procedure.

The procedure for the experimental groups consists of three steps.
Step I: All applicants are ranked according to their school-marks and/or USAT scores. From the group with top marks approximately six times as many as will finally be accepted are chosen for the next step. There are two restrictions. Only those students who have elected Linköping as their first priority can go to the next step, and only those who have declared their willingness to participate in the admission procedure at Linköping.
Step II: A couple of months after their application has been received, around 100 applicants come to Linköping for almost a full day. They will receive extensive information about the educational system at the Health Faculty and undertake different written tasks (see below). The 45 best of these applicants proceed to the next step.
Step III: One to two weeks after Step II these 45 applicants come to Linköping for a one-hour interview (see below). A final ranking of the applicants results in the top ones being admitted.

Although the control group is admitted according to the national admission rules, these students are interviewed during the first days of the course in the same manner as the experiment group was during Step III.

A student who accepts to take part in the local admission procedure in Linköping does not loose his or her place in the ordinary national admission process for medical schools, but, where two offers are made, the admission to Linköping takes precedence.

The effect of the two admission procedures will be investigated by collecting data about student drop-outs, and successes and failures in examinations. Data that may indicate the prognostic value of the admission procedures are obtained from written, oral and practical examinations after every semester (20-21 weeks) during the whole study programme. At the end of semesters three, five and eleven more complex examinations take place. These include video-taped patient interviews and examinations, problem identification and problem solving, survey of the literature, and presentation of actual research data highlighting a relevant patient problem.

After Steps II and III the applicants and everyone who has been involved in the selection programme participate in an evaluation of the arrangements, the administrative procedure, and how they have experienced the admission procedure as a selection instrument. The reliability of the admission instruments is calculated after every admission, and some data are given below.

Design of the Selection Instrument

The selection procedures at the medical schools in Newcastle, Australia, Beer-Sheva, Israel, and McMaster University, Canada were studied both during site visits and from the literature (Antonovsky et al., 1979; Vinson et al., 1979) . In the literature there are conflicting reports regarding the value of the interview for the selection of medical students. DeVaul et al. (1987) found that the interview of the Houston model lacked predictive value in relation to medical career, and the method had an adverse cost-benefit ratio. However, these results conflict with those at the University of Newcastle, Australia (Powis et al., 1988), where the interview identified students who failed to complete the course and helped to predict students who graduated with honours.

There is support in the literature (Mischel, 1968; Magnusson, 1981) that concrete action in contrast to general verbal expression of one´s will makes prediction of future behaviour possible. Therefore, the instruments were based on the principle that the best way to gain an idea of what you may be doing tomorrow is to ask what you are doing today.

Special selection instruments have been constructed for Steps II and III. In Step II written tasks are evaluated by a pair of assessors who are teachers in the Faculty. In Step III interviews are conducted by an academic and a layman of the opposite gender. The instruments were designed to generate data on aspects of the personalities of the applicants. The variables can be summarised under four categories: a) *General study ability and cognitive flexibility.* These aspects are highlighted in Step I. The assessment in Steps II and III concentrates on abilities of special importance for both the study of medicine and the medical profession; b) *Motivation.* Overall interest for medical education is evaluated. The reasons for chosing to study medicine are scrutinised, and the degree of realism of the candidate's view of the profession is assessed; c) *Mental energy.* Endurance, stress tolerance, decision making, and ability to overcome difficulties and misfortunes are examined; and d) *Social competence.* This category reflects the candidate's ability in various situations to relate to patients, family, colleagues, and professionals from other professions. It has many facets of special relevance to health care. Sub-characteristics are, e.g. communication, collaboration, management, self-evaluation, tolerance, and integrity.

These categories and their characteristics form the basis for the design of both the written tasks in Step II and the content of the interview in Step III.

Step II includes four sessions. In the first the applicants obtain information about the design of the special study-programmes at Linköping. The following three sessions include a written explanation of motivation for the choice of this professional career, a structured personal life description and an essay. The whole procedure takes about five hours including a break for lunch.

The written explanation of motivation is primarily designed as a basis for evaluation of motivation (b), but the design of the tasks makes it possible to evaluate also mental energy (c) and social competence (d).
On a preprinted proforma the applicant can highlight his/her motives for medical studies, especially the Linköping model, and his/her choice of occupation in a maximum of 300 words.

A structured personal curriculum vitae provides a basis for assessment of mental energy (c) and social competence (d). The applicants are informed that their experiences must be confirmed by referees.

Social competence (d) (linguistic ability and personal flexibility) is evaluated in the essay. In three to four pages the applicants have to deal with one of three themes. The task is to highlight the theme with as many relevant aspects as possible and to discuss it. Examples used so far are: "Private or public health care delivery?" and "Controversy about free abortion".

Step III consists of an interview. During the interview a final evaluation of the characteristics (b), (c) and (d) is made; special emphasis is placed on social competence (d). All interviews are opened and closed in the same way, and a number of areas are explored by the interviewers. The interview is not otherwise structured. There are no fixed questions except for the introductory and the final ones, and there is no predetermined sequence for the different areas to be explored. The interview takes 45-60 minutes, and the two interviewers alternate in posing questions.

The instruments for selection are confidential and they are retained by the admissions committee.

The Selection Procedure

Step II

In order for Step II to be as objective as possible, assessment manuals were developed for the written tests. The assessors are teachers in the Faculty (mainly physicians) and work in pairs. The applicants are divided into groups of approximately 20. The groups are matched for age, school marks or scores at USAT and randomised. The groups are allocated at random to the evaluators. The papers are assessed by the two assessors independently of each other. Subsequently they meet and decide a common ranking order for the applicants within the group. The assessors also supply the admission committee with a report on the overall quality of the group. If the assessors do not reach consensus, separate ranking is given to the admissions committee with reasons for the disagreement. However, this has not happened so far.

In both Step II and Step III the performance of the applicants is ranked on an ordinate scale from 1 (bad, unsuitable) to 5 (excellent). From every group the nine applicants with the highest ranking are invited to participate in Step III.

Step III

The interview is conducted by two interviewers - one male and one female. One comes from the Faculty of Health Sciences, and the other is a layman with experience in assessing human qualities, e.g. a judge, lawyer, priest, teacher. Groups for interview, 9 - 10 students, are composed in the same manner as for Step II. The interviewers rank all applicants independently before they arrive at a common rank order. In case of severe disagreement on an applicant (>2 scale steps in the overall rating), the applicant will be interviewed again by another pair of interviewers. During the first two admissions this has not happened. The admissions committee undertakes the final selection, based on the interview data.

Instruction and Training of Assessors and Interviewers

The interviewers were given a whole day of instruction and training, and the assessors were given half-a-day. Both groups received written guidelines for the ranking of the applicants in order to limit differences between interviewers or assessors and between the interviewer or assessor teams.

Organisation for Planning and Implementation of Assessment and Selection

The responsibility for the planning and implementation of the new selection procedure was given to a Steering Group selected by the Board of the Faculty of Health Sciences. The development of the special selection instruments was undertaken by the Department of Education and Psychology, Linköping University. They were responsible for:

- defining selection criteria;
- developing special selection instruments;
- constructing assessments in Step II, checklist, and training of Step II assessors and Step III interviewers;
- planning of the first two selections;
- acting as consults during the implementation of the admissions procedure;
- controlling the reliability of the selection instruments;
- estimating time, costs, etc.; and
- discussing principles for the long-term evaluation.

Before the instruments were used in practice they were tested with upper secondary school pupils. The final design was decided by the Steering Group. Test interviews were video-taped and discussed by the Steering Group, in order to establish more precise criteria and proposals for interview questions.

The Steering Group was also the admissions committee for the first two admissions, but a specially elected admissions committee will thereafter assume that responsibility. That admissions committee will consist of the director for undergraduate studies and representatives of the teachers and students.

Experiences from the Autumn 1991 and Spring 1992 Admissions

A large number of students applied on both occasions, 925 for the Autumn semester 1991 and 405 for the Spring semester 1992. From these groups 17 and 18 applicants respectively were admitted as the control group according to their marks from upper secondary school or test scores in the USAT. Of the 925 applicants 740 satisfied the condition that they had nominated Linköping as their first choice. For the Spring semester, of 405 applicants 314 met these restrictions (nominating Linköping as their first choice).

For the local admission selection the figures for the different steps were as follows; the figures for Spring 1992 are presented within brackets. In Step II 118 (100) applicants were selected from 740 (314) who had nominated Linköping as their first choice; 46 (45) of these applicants proceeded to Step III; and 18 (18) were admitted following the interview (Table I).

Table II shows the age distribution at the different steps. The tendency that the older applicants were favoured for the Autumn entrance was not significant ($p = 0.09$).

The reliability of the methods was studied as a percentage agreement (A) directly related to the score difference between two assessors (interviewers) in the scoring of different characteristics:

$$A = 1 - \frac{\text{Sum of score differences}}{\text{Maximum number of score differences}} \times 100$$

(Öst, 1979)

Sum of score differences: The sum of all the differences between two assessors. Maximum number of score differences: The sum of possible differences between two assessors. The results for Step II (Table III) are all significant ($p < 0.01$). Table IV shows the corresponding agreement between two interviewers for five interview groups in Step III. All are significant ($p < 0.01$).

The applicants and the assessors in Step II and the applicants and the interviewers in Step III answered a questionnaire. The instrument called for the use of rating scales and comments. The scales had seven steps from bad, incomplete, etc. (1) to good, complete,

Table I. Applicants at the successive steps in the admissions procedure. Applicants with University Standard Aptitude Test (USAT) are compared with applicants with grades from upper secondary school. Males are compared with females.

	Autumn 1991					Spring 1992				
	Total	Men	%	Women	%	Total	Men	%	Women	%
Step I										
Grades	740	344	46	396	54	314	149	47	165	53
USAT	646	305	47	341	53	260	123	47	137	53
Step II										
Grades	74	29	39	45	61	66	16	24	50	76
USAT	44	32	73	12	27	34	28	82	6	18
Step III										
Grades	26	10	38	16	62	35	9	26	26	74
USAT	20	11	55	9	45	10	8	80	2	20
Admission										
Grades	11	7	64	4	36	13	2	15	11	85
USAT	7	2	29	5	71	5	4	80	1	20
Control group										
Grades	12	4	33	8	67	12	3	25	9	75
USAT	5	5	100	0	0	6	6	100	0	0

Table II. Age distribution of the applicants

Age	Applicants				Step II				Step III				Admitted				Admitted Controls			
	Autumn	%	Spring	%	Autumn	%	Spring	%	Autumn	%	Spring	%	Autumn	%	Spring	%	Autumn	%	Spring	%
18-21	440	59	186	59	66	56	56	56	20	44	26	58	8	45	12	67	5	29	5	28
22-45	300	41	128	41	52	44	44	44	26	56	19	42	10	55	6	33	12	71	13	72
Total	740		314		118		100		46		45		18		18		17		18	

etc. (7). The applicants rated different aspects of the admissions procedure and how they estimated their opportunity to demonstrate their aptitude for the study of medicine and their potential success as a doctor. The response rate for the applicants was 100%. The assessors and interviewers rated different aspects of the admissions procedure and their opinion of the reliability and validity of the instruments. At each step two did not complete the questionnaire.

The applicants recorded very positive ratings for almost every aspect of the admissions procedure on both occasions and in both Step II and Step III 6.4±1.2. Their ratings on the face validity of the admissions procedure demonstrated considerable confidence in the instruments. In Step II their rating of the opportunity to demonstrate their potential educational and professional success and their motivation for their studies and profession were 5.2±1.4. In Step III the equivalent ratings were 5.8±1.1. In Step III the applicants also expressed their confidence in the interviewers and rated their competence. These ratings were very high, 6.4±0.9. These statistics represent weighted means and standard deviations combined from several items.

On the whole, the assessors and interviewers were also very positive towards the admissions procedure. They contributed on average 14 hours in Step II and 18 hours in Step III. When they commented on, or rated different aspects of reliability, they demonstrated a fairly strong belief in the instruments. However, they were not so sure about a strong relationship between the admissions procedure and the main criteria (academic and professional success).

Discussion

At the first selection for admission there was a very large number of applicants. On the second occasion the number was considerably smaller. The reason was probably an urgent need for this type of admission for applicants who are less successful in upper secondary school or USAT examinations, resulting in a high number of applicants with lower scores. On the second occasion there was a more normal number of applicants who gave Linköping as their first choice. The figures from the two admissions confirmed earlier experiences in Sweden that grades from upper secondary school favour girls and USAT results favour boys.

Table I illustrates that the girls obtained lower scores in the aptitude test and, therefore, decreased considerable the numbers between Step I and Step II. However, more girls than boys were selected, based on marks from upper secondary school. This difference is statistically significant $p<0.01$ (chi-square) for both admissions. The figures for the controls show that school examination marks clearly favoured girls and USAT favoured boys. This observation is confirmed by a recent national study (H. Jansson, personal communication).

There was a clear tendency at the first selection that older applicants score more highly on life experience in Step II. Therefore, at the second selection the relative weight of these experiences was decreased, in order to lessen any bias between applicants above and below 22 years of age. The change was marginal and did not in essence change the prerequisites for the experiment.

Tables III and IV show that reliability was acceptable in Step II and very good in Step III. The reason for higher reliability of the interview scores is probably that the interviewers cooperated better as they compared their respective rating after every interview. Also, the interviewers had a whole day of training, and it is probable that the assessors for Step II should have more than half a day of training.

The enquiry among both applicants, assessors and interviewers showed good satisfaction with the administrative procedures and arrangements. The applicants also demonstrated confidence in the competence of the interviewers.

There are, of course, no data as yet on the prognostic value of the admissions procedure. The evaluation will use indicators such as permanent or temporary drop out, counselling to change from medical studies, e.g. due to unsuitable personality, poor results in theoretical and practical clinical examinations and unsatisfactory assessment during the clinical training period. The students will contribute by reporting, during their evaluation after every semester, on the development of their learning process and self-development.

Validity is the main issue for the whole experiment. So far we have two different views on the face-validity of the instruments. We are confident that concept-validity is profound. Psychological expertise has based the components in the different instruments on well established theories.

The admissions procedure is quite costly compared with traditional practice. However, every permanent drop out is expensive for the Faculty. This will be important in the proposed new university system in Sweden where the Faculty will obtain resources in relation to the number of students who graduate. The costs of the admissions programme was around $ 800 for each student admitted (cost of staff time not included). This is acceptable in the light of the high expenditure for every medical student at approximately $ 18,000 per year for the five and a half year course.

Table III. The mean reliability as a percentage of the 5 pairs of assessors in Step II for the three tasks

	Autumn 1991		Spring 1992	
	Mean	**Range**	**Mean**	**Range**
Life description	82	69 - 90	84	73 - 93
Motivation	70	63 - 78	77	65 - 87
Essay	70	61 - 83	81	76 - 88

Table IV. The mean reliability as a percentage of the 5 pairs of interviewers in Step III for the four criteria.

	Autumn 1991		Spring 1992	
	Mean	**Range**	**Mean**	**Range**
Social competence	93	86 - 97	95	89 - 97
Psychic energy	96	92 - 100	95	89 - 100
Motivation	91	88 - 97	91	81 - 97
Summarised evaluation of eligibility	94	90 - 97	95	86 - 100

Conclusion

This form of selection for admission is new for Sweden. The results are based on only two of the six selection exercises in the present experiment.

In contrast to earlier negative attitudes by government, central authorities, academies and students to local and individual admission systems, the present experiment has so far been an overwhelmingly positive experience. The selection instruments for Steps II and III have functioned well and are regarded with confidence by both applicants, assessors and interviewers. The experiences are still too limited for an evaluation of the validity of the instruments. The reliability of the instruments has so far proved to be quite acceptable.

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The Program for Educational Development

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Abstract

The Program for Educational Development (PED) at McMaster University is now over 20 years old. Its organisation was a radical departure from the conventional office of medical education. It is organised along the lines of an educational programme with academics recruited from a number of departments. The focus of the PED is on educational research and development, and its responsibility to the Faculty is primarily at the level of consultation and innovation. The approach has certain advantages and disadvantages, which are discussed.

Organisation, Mission and Activities

The innovative medical school at McMaster University entered its first class in 1969, and, shortly thereafter, the Program for Educational Development (PED) was established as the locus for educational research and development activities. The establishment of an office of medical education as an adjunct to the affairs of the medical school was not uncommon in those times. George Miller had begun the first office of medical education not far away at Buffalo, New York, in the mid 1960's, and this model had "metastasised" to the large and renowned offices at Michigan State University under Hilliard Jason, at the University of Illinois under George Miller, and at the University of Southern California under Steve Abrahamson. Vic Neufeld, the first chairman of the PED, spent a sabbatical year at Michigan State in 1969, and had the opportunity to view the operation of such an administrative structure at first hand.

Neufeld, together with Howard Barrows and Jacqui Wakefield, chose a model for McMaster which was very different from these offices; a difference which is, in fact, embodied in the title. First, it is a programme, not an Office or a Department. At McMaster, these words have significant meaning. From the outset, the Faculty had adopted a "matrix management" approach, in which all education, research and service activities took place through programmes, while individual faculty members resided in departments. Programmes have separate administrative structures from departments, and have no faculty

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appointments. The prototype Programme was the undergraduate M.D. (Medical) programme, and the administrative structure was designed to ensure that the curriculum would not be dictated by the Chairmen of departments. PED, by becoming a programme, is more closely allied with other educational and research programmes, drawing support from a diversity of departments, than as a separate department with its own academic staff. To this day, no faculty member has an appointment in PED - the chairman is in the Department of Clinical Epidemiology and Biostatistics (CE&B), and other core members are based in the Department of Family Medicine or CE&B.

"Educational", the second word in the title, is also significant. It is not "Medical Education". At McMaster, the medical programme is one of many educational programmes in the Faculty of Health Sciences. It was perhaps prescient on the part of the original architects of the PED to avoid the term "medical" in the title. It has provided scope for the involvement and substantial contributions by professionals from a variety of health disciplines (nursing, physiotherapy, occupational therapy, etc.).

The last word, "Development", actually stood for "Research and Development" in the eyes of the original planners. PED certainly has maintained these parallel activities throughout its history. Development has always been there, but it has been accompanied by an emphasis on exploring the "basic science" of education, and PED members have contributed substantially to theoretical and methodological developments in the study of clinical reasoning and in research into evaluation.

The result is that the Program for Educational Development is quite unlike most other education or research programmes. Involvement is voluntary for all but a few support staff. It attracts a wide range of individuals with some interest in educational research and development. The tangible rewards for those who are involved are an occasional conference or publication. However, we hope that these are matched by the intangible rewards which come from the opportunity to share ideas about education and engage in critical analysis and research of educational problems. Presently about 40 academics are affiliated with PED. They represent most departments in the Faculty of Health Sciences. Much of the work is done together by these individuals and support staff, some five research associates, two administrative staff, and three secretaries. Most of our financial support is derived from outside sources, and the remainder from University funds. For many years the external funding came from small research grants, but more recently we have been fortunate to attract more long term funding for several large research projects.

In contrast to many offices of medical education, we have a less direct accountability to the educational programmes. The philosophy of the Faculty has always been that the educational programmes are owned by all faculty members, not by an educational elite. The idea of placing large management responsibility for the educational programmes of the Faculty in the hands of a few professional educators is not consistent with the Faculty's philosophical stance.

There are, of course, some service responsibilities in any school that are necessary for the survival of educational programmes. Faculty development (e.g. tutor training workshops, problem-based learning workshops, leadership programmes) was originally developed by some individuals in PED, it then became a separate arm of PED, and it has now become an independent programme. Learning resources development has similarly evolved from an activity of the Audio-visual Department to a separate office in the Faculty. A joint executive was created to manage the overlap among the three areas (faculty development, learning resources, research), but perhaps the degree of shared activity is too little. For example, there has been little effort to rigorously evaluate the impact of faculty development activities or to explore alternative models of learning resource design.

What, then, is the major role of PED within the Faculty? Its members act in the role of consultant and facilitator. Our mission is, in part, to keep ourselves informed of the literature and other developments in education outside McMaster, so that our educational leaders can make informed and rational decisions. We are also available to offer advice and support for initiatives in education. These range from studies of innovations, like the introduction of OSCE assessments into the nursing programme or study of the reliability of the admission's interview in the occupational and physiotherapy programmes, to ongoing support of major innovations like the major curriculum changes in the M.D. programme in the early 1980's. In part, this is achieved by the Faculty's financial contribution to PED - one research associate is paid by the Faculty to support ongoing educational developments. In addition, academics and research staff, whose primary responsibility is to specific externally funded projects, may contribute some of their time and expertise to internal projects.

PED has had a long standing interest in stimulating educational research through faculty development. We have sponsored a Fellowship programme for many years. This attracts from one to four fellows each year from around the world for durations of three months to a full year. Fellows can base themselves in PED and essentially design their own programme, ranging from the very research-orientated, with attachment to a research group, or courses in design and statistics, to a very much more practical orientation, with workshops in tutor training, problem-based learning, and co-tutoring. There is no tuition or other fee, and we can provide some facilities and support (e.g. computers, limited secretarial support) for fellows. More recently, we joined with the University of Toronto in their M.Sc. in Medical Education, offered through the Ontario Institute for Studies in Education. This will make it easier for our own faculty staff to pursue advanced degrees in education.

We also use a number of other means to stimulate interest and involvement in educational issues. Education Rounds are held once a month, on Wednesday at noon. About two years ago, we developed a "Discussion Forum in Education" to give educational leaders the opportunity to discuss educational issues of local concern and to stimulate research on the issues. PED members also meet at Education Research Seminars on Friday morning once a month to hear about work in progress.

Advantages and Disadvantages

The organisation of PED is in some respects a microcosm of the organisation of the Faculty. This involves an interplay between departments and educational programmes. At McMaster, departments do not quite resemble feudal fiefdoms to the extent they do in many other Faculties; and PED, with its base on the programme axis of the matrix, can move freely within the departmental structure. This framework has permitted maximum flexibility. However, the negative side is some sacrifice of visibility and coherence, so that often no one seems to really know what is happening. Individual faculty members, even those who are card carrying members of PED, frequently have trouble in identifying with it as a corporate whole.

The structure has some disadvantages: it is difficult to recruit faculty members specifically for their expertise in educational problems, as priorities for recruitment are established, by and large, by the chairmen of departments. Yet, it is difficult to envision any alternative arrangement which would provide the flexibility that PED enjoys. It has enabled the programme to be responsive to the majority of educational programmes in the Faculty, and it has permitted us to involve academics from nearly all departments.

PED's heavy dependence on external funding has been a double-edged sword. It has clearly kept us "lean and mean" through the years, and it has contributed immeasurably to our high productivity in medical education research. It has also permitted us to be maximally responsive to short term demands, as we have used our resources to highlight educational issues which involve a cross-section of faculty members in educational research. This creates a large cadre of individuals to address internal as well as external demands and priorities. A disadvantage is that the major unit of activity is often the research project, and many members, both academics and staff, quite appropriately, see their attachment to the principal investigator and the project first, and to PED second. Reliance on external funds has also contributed to an anxiety among support staff with regard to future funding arrangements. At present, funding is stable, but this period will inevitably come to an end. The arrangement presents a constant challenge to the leadership to devise ways to encourage all to see themselves as part of a larger corporate enterprise, and also to ensure that they are valued beyond the immediate horizon of their present research grant.

It is clear that we have traded off the investment in a cadre of individuals with great expertise in education, for a much larger array of faculty members, with individually considerably less expertise. We have relied on our ability to nurture individuals so that they can, in time, emerge as competent first class members of the educational research/

development community. There are a few notable successes, but at times the process appears to proceed at a snail's pace.

Nevertheless, on balance, we believe the advantages outweigh the disadvantages. George Miller (1981) has been very complimentary of this model: "... it was Steiger's view in 1971 that the most impressive integration of educational science into the work of a medical school was to be found not in any of those with large educational centers, but at McMaster, which had no formal educational research and development unit. It still has only a "Program for Educational Development..." There have been several occasions over the years when opportunity existed to change ourselves into the model of a large educational centre. Each time, on careful reflection, we decided we liked ourselves "just the way we are". Current research and development activities are summarised in the Appendix.

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Appendix

Current Research and Development Activities

Professional Behaviours (Bienenstock, Keane, Eaman)
This group has been active in defining and measuring "professional behaviours" of medical students, which can be observed and assessed in the small group setting and which are predictive of behaviours used with patients in the clinical setting. To date, considerable effort has gone into developing scales, and studies of reliability of observations in the small group and in the clinical setting are now underway.

Evaluation of Quality of Teaching (Wakefield, Keane)
This group of individuals in both Faculty Development and PED has been attempting to derive methods for the evaluation of quality of teaching. A literature review was conducted*, and a faculty survey of attitudes towards teaching and evaluation of teaching has been completed. The results are being analysed and will be used to suggest future directions.

* See paper by Wakefield and Keane in this Volume of the Annals.

Clinical Reasoning (Norman, Brooks)
This long-standing interest group has recently undertaken studies in visual domains such as dermatology and radiology. The major goal is to understand the organisation of knowledge and its development with expertise. The studies to date have provided an explanation for observer variation in some clinical domains, and have implications for the teaching of methods of clinical diagnosis.

Physician Review Program (PREP) (Davis, Premi, Hannah, Norman)
This group was formed three years ago in response to a request from the College of Physicians and Surgeons of Ontario. The group has developed methods for the educational diagnosis of physicians referred by the College with concerns about competence. A number of studies supporting the reliability and validity of the multidimensional approach to evaluation has been conducted.

Geriatric Education (Blumberg, Ryan, Deveau)
A number of activities in geriatric education are being conducted by the Geriatric Educational Development Unit, a component of the Educational Centre for Aging and Health. They have reviewed and revised many health care problems used in the undergraduate education programmes to include relevant and accurate data related to aging. Current research is investigating the effect of patient age in health care problems on student

learning. As this unit is charged with evaluating the entire Educational Centre for Aging and Health, they are collecting quantitative and qualitative data from programmes.

Educating Future Physicians of Ontario (Neufeld, Shannon, Pickering, Norman)
This major activity involving all five medical schools in Ontario consists of three components. Component I is developing methods to assess the health care needs of Ontario by interviewing consumer groups, practitioners, etc. Component II is developing faculty development programmes applicable to the medical schools. Component III will develop assessment methods to assess the students' mastery of these skills. Specific methods have been developed to assess ethical skills, critical appraisal skills, and interpersonal skills in an objective, structured clinical examination (OSCE) format. The administrative operation of Component I and some operations of Component III are housed at McMaster.

Studies in Radiology (Norman, Coblentz)
This group is exploring some of the determinants of observer variation in radiology. Studies of the diagnosis of bronchiolitis have been completed and new studies of mammography are underway.

Studies of the Careers of McMaster Graduates (Woodward, McAuley, Ferrier)
A series of studies documenting the outcomes of medical education at McMaster has been undertaken, using surveys of graduates and postgraduate supervisors, secondary data sources have been used to explore similarities and differences in the practice performance patterns of graduates from McMaster and other Ontario schools.*

* See paper by Woodward et al. in this Volume of the Annals.

Studies of the Impact of Women on Health Care Delivery (Woodward, Cohen, Ferrier)
These investigations are exploring how career development of men and women physicians are similar and different, and the factors underlying the differences.

Studies of aspects of the M.D. Program (Blumberg, Cohen)
These studies address several important aspects of the process of education in the undergraduate medical programme. One study examined students who were given unsatisfactory assessments to determine when these occurred, and if the students' difficulties could have been predicted earlier from review of the written reports on students. Another study surveyed education coordinators at nine medical schools to determine attitude toward "forward-feeding" of assessment information about students.

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MEDICAL EDUCATION WORLDWIDE

World Federation for Medical Education

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The main activities of the Central Office of the World Federation for Medical Education (WFME), can be **summarised** as follows:

1. Reorientation of medical education at the **global level** is being promoted. Collaboration with the World Health Organisation Headquarters occurs intensively. In addition, close participation in the work of UNICEF is regarded as a priority, and active cooperation in the medical education field with UNESCO advances.

2. Support is given to **regional activity** in the medical education and health care sectors, through joint activity with the six Regional Offices of the World Health Organisation and with the six Regional Associations for Medical Education of WFME. The Ministerial Consultation in Africa (Ministerial Consultation for Medical Education in Africa, 1989), for example, with the WHO Regional Office for Africa and the Nigerian Government (Professor Ransome-Kuti), resulted in major developments in Africa (the Task Force) and Intensive visits to African countries by the Secretary of Health of the U.S., Dr. Louis Sullivan (Sullivan, 1991).

3. Approaches from **national governments** have been responded to, in particular from ministers of health and their advisers. An example was the dialogue between WFME and Iraq during the Gulf War and subsequently, and now with Yugoslavia. The Federation meets with Health Ministers, as in the former USSR recently, and makes the policies of ministers widely known.

4. **National associations for medical education**, either through their regional associations or directly to the World Federation, have been assisted whenever possible. Such assistance is critical in India, for example, and in African countries.

5. The **projects**, specified at the 1988 World Conference and subsequently (World Federation for Medical Education, 1988), as a major aspect of the International Collaborative Programme for Reorientation of Medical Education, have been initiated, at global,

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regional, national and institutional levels. In Europe, for example, medical education in Portugal in all its stages is being reoriented, by WFME, UNESCO, WHO BURO and the Portuguese Government. A major regional Continuing Medical Education project, with WHO BURO, involves all countries of Europe.

Development Plan for WFME Central Office

The World Federation for Medical Education, the University of Edinburgh, the Centre for Medical Education of its Faculty of Medicine, the City of Edinburgh District Council and the Scottish Development Agency completed the Development Plan (World Federation for Medical Education, 1991) ensuring a longterm Central Office as a base in Edinburgh for the World Federation for Medical Education, to implement the International Collaborative Programme for Reorientation of Medical Education as mandated at the World Conference in 1988.

The new address of the World Federation for Medical Education is: The University of Edinburgh Centre for Medical Education, 11 Hill Square, Edinburgh, EH8 9DR, United Kingdom.

The Executive Council of WFME

The Executive Council will meet in Edinburgh on 14-15 April 1992: Professor Henry Walton, Chairman; Dr. Pablo Pulido, Executive Director, Panamerican Federation of Associations of Medical Schools; Dr. Jasbir Bajaj, President, South East Asian Regional Association for Medical Education,; Dr. Mahmud Mohd Nor, President, Western Pacific Regional Association for Medical Education; Professor Albert Oriol-Bosch, President, Association for Medical Education in Europe; Dr. Bashir Hamad, President, Association for Medical Education in the Eastern Mediterranean Region; Professor Kopano Mukelabai, President, Association of Medical Schools in Africa; Dr. Andre Wynen, World Medical Association, Brussels; and Dr. Eric Goon and Dr. Charles Boelen, Division of Human Resources for Health, WHO Geneva.

International Collaborative Programme

Progress with four of the projects will be mentioned:

1. Statement on Medical Education in Europe

Under the auspices of WFME, an enquiry was carried out and recommendations in nine key areas of the training of doctors were agreed at Heraklion, Crete on 26 September 1989 (Mediterranean Medical Society, 1990), with the full participation of the WHO European Office. The Association of Medical Deans in Europe has endorsed the Statement, which has been extensively reviewed by all medical schools in the Region.

2. The Portuguese Project

The Portuguese Project, to reorientate medical education in Portugal as decided at the Lisbon Ministerial Consultation in Europe, has completed its first stage. The guiding body is the Interministerial Commission in Portugal, assisted by an International Committee which Professor Walton chairs, and on which the European Office of WHO is fully represented. UNESCO sponsors the project with the Government of Portugal.

3. The CME in Europe Project

The steering Group has set up a Task Force with representatives nominated from all countries in Europe. This is the opening phase of a planned extension to a global project.

4. Global Curricula

WFME is developing curricula in six specialties with the corresponding international specialist Federations: Neurology, Public Health, Paediatrics, Otorhinolaryngology, General Practice and Child Psychiatry.

Collaboration with the World Health Organisation, UNESCO and UNICEF

WFME works in close collaboration with the United Nations and its specialised agencies, especially WHO, UNICEF and UNESCO.

World Health Organization

WFME is represented as a non-governmental member in official relations, at the meetings of the Advisory Board of WHO in Geneva, at the World Health Assembly in Geneva, and at the meetings of the Regional Committees annually of the six WHO Regional Offices. WFME works particularly closely with the Regional Directors and with the Division for Development of Human Resources for Health (HRH) in the Geneva Office.

WFME is actively associated in the implementation of the important HRH document, "Changing Medical Education: An Agenda for Action" (World Health Organization, 1991).

United Nations Children's Fund

WFME is in close association with UNICEF, the main links with Dr. James P. Grant, Dr. Nyi Nyi, Dr. Ranjit Atapattu and Ms. Mary Cahill. The Federation on all possible occasions seeks to promote UNICEF's aims. The notable UNICEF World Summit for Children which took place in New York in September 1990, has resulted in resolutions many of which are relevant to medical education and the training of physicians.

United Nations Educational Scientific and Cultural Organisation

A contract has been signed by UNESCO with WFME, in support of the Portuguese Project. The Director General, Dr. Federico Mayor, is represented by Dr. Claude Rosenfeld on the International Committee.

The Network of Community-oriented Educational Institutions in the Health Sciences

WFME seeks the closest possible partnership with the Network.

Promotion of the Edinburgh Declaration

The endorsement of the Declaration has been extraordinarily widespread3 and it is now extremely well known and reference to it is usual when reform of the training of doctors is under discussion. With the help of WHO Geneva and the six WHO Regional Offices, the 12 principles of the Declaration will be more widely conveyed to as many teachers or doctors as possible.

Implementation of the International Collaborative Programme for Reorientation of Medical Education continues, by development of further global, regional, national and institutional projects for reorienting the training of doctors as detailed in the Report of the World Conference on Medical Education, and the Reports of the Ministerial Consultations when Ministers of Health and Ministers of Education were brought together by WFME, the relevant WHO Regional Office, and a host Government, e.g. Nigeria in the case of Africa, and Portugal for Europe.

(see "Ministerial Consultation for Medical Education in Europe: Report of a WHO Meeting", EUR/ICP/HMD/115, and "Medical Education in Africa: An Agenda for Change", Ibadan 1989)

Implementation of the WHO HFA Policy

As has been stated frequently at the World Health Assembly, the Edinburgh Declaration in the field of health professions education has the standing the Alma Ata Declaration has in the field of health care. The WHO and the WFME policy run in parallel, and as far as the latter body is concerned will continue to do so.

Dr. Louis Sullivan has stated2 :

"I have followed very carefully the work of the World Federation for Medical Education, the international organisation concerned with medical training based at the University of Edinburgh, The Federation is attempting, in the words of President Henry Walton, to implement a Programme of wide reassessment of the training of doctors on a global level, and to reorient medical education to be as relevant as possible to contemporary health needs of communities".

This WFME policy will coninue actively, at the level of action now that a mandate for reform exists.

Second World Conference on Medical Education

It has been proposed widely that a further World Conference on Medical Education should take place in 1993. Planning Groups will meet meanwhile, and the proposal is that the six Regional Associations should consider the World Conference their major Regional activity, WHO has agreed in principal to be a main co-sponsor, and the full co-sponsorship of the six WHO Regional Offices has been given by the six Regional Directors.

Fifth International Conference on Assessment of Clinical Competence

This conference, co-sponsored by WFME, will be held at the Centre for Medical Education, Dundee, on 1-3 September 1992.

The Mediterranean Medical Society

The Society is potentially of great importance in improving health care. It operates in, and therefore brings together, the spheres of four WHO Offices: the Geneva Headquarters, AFRO, EMRO and EURO. The Society has two main aims: the improvement of health care, and reform of medical education and the training of doctors. The Second Meeting of the Society will be held in Athens on 21-25 June 1992, and will be addressed by the WFME President and Dr. Charles Boelen, HRH Division, WHO Geneva.

Priorities decided by the WHO Regional Directors

In promoting the WFME International Collaborative Programme, each Regional Director has designated a priority area:

I. Dr. L.G. Monekosso, AFRO: Community Based Training
II. Dr. Carlyle Guerra de Macedo, PAHO:
    a) Fostering the access to scientific information.
    b) Medical education, pattern of practice and health needs.
III. Dr. H.A. Gezairy, EMRO: Community Oriented and Community Based Medical Education
IV. Dr. U. Ko Ko, SEARO: Practicalities of reorienting medical education.

V. Dr. S.T. Han, WPRO: Basic Medical Training.
VI. Dr. J.E. Asvall, EURO: Continuing Medical Education.

Summary

All the aims of WFME stand to be augmented by the partnership with the Network, which the two bodies have recently reconfirmed.

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Annals of Community-Oriented Education
1992, Vol. 5, 315-316

Changing Medical Education: An Agenda for Action

Charles Boelen
Geneva, Switzerland

The physician of tomorrow should be able to respond better to the needs of communities. Therefore, on the one hand, he will need to possess the competences necessary to promote healthy lifestyles and to communicate with consumers and community leaders in order to obtain their involvement in health activities. On the other hand, he should be capable of critically applying the latest technologies in health sciences and making decisions that take into account ethical, financial and continuation of care issues, striking a balance between the expectations of patients and of society at large. In order to have a better understanding of health needs in relation to the total requirements of an individual and of the community, he should be capable of continuing his work with others even outside the health sector, and of making better use of information and managerial techniques in planning and performing his duties.

Dramatic changes will be required in medical practice; these will call for important interventions, among which is an equally dramatic change in medical education. Changes in basic medical education will actually affect the delivery of health services only 10 to 15 years later. Therefore, national authorities, training institutions, and professional associations are urgently called upon to initate and support a movement that will strive to educate the new medical and health work force and re-educate the existing one to respond to society's emerging needs and demands.

It is higher education that beares the responsibility for preparing a manpower in line with a prospective vision of what society's future needs and demands will be. As for the medical profession, not only should it anticipate the nature of the education required, but is should also contribute to finding appropriate ways to optimise the use of human resources for health. Medical schools and other university bodies should and can take measures to use their potential and resources accordingly. In the absence of such initiatives., forces outside the academic and professional world may well take the lead and impose changes that may not fully involve medical education and the medical profession.

An understanding must be reached on what is meant by "quality medical education" in order to design and apply meaningful strategies to achieve it and to know what to monitor.

Copies of the full document, with its more specific proposals, may be obtained from Charles Boelen, Chief Medical Officer for Educational Development of Human Resources for Health, World Health Organization, 1211 Geneva 27, Switzerland.

The assumption is that, if countries or institutions were able to determine as objectively as possible to what extent advocated changes apply to them, they would be more inclined to accept the idea of reorienting medical education. These values entailed in "quality medical education" would influence the setting of standards in medical education and would serve as goals towards which strategies for change would be aimed. Indicators and criterial would be proposed to assess, in terms as quantifiable as possible, to what extent current situations meet the standards that have been decided upon.

Because of the complexity of the change process in medical education and because of a variety of determinants that may influence it, depending on the pecullarities of the political and sociocultural context., there is no unique treatment for all possible situations. Itineraries leading to the goal of the proposed new mandate may vary form place to place, but the goal should essentially be the same. Several strategic approaches should be proposed as optional entry points into the voyage towards change. The formulation and implementation of strategies for change are to be considered as action research projects. Protocols would be developed outlining the main characteristics of each strategy, and then proposed to the main actors in the reform of medical education so as to make them fully aware of the requirements and constraints entailed.

A close watch should be maintained on worthwhile endeavours and achievements in adjusting medical education that result in the betterment of people's health. Countries, institutions, and individuals engaged in a change process are always eager to learn from the experiences of others so as to improve their own practices. Keeping each other up to date creates solidarity among those who have the courage and take the risk to break with the status-quo, and this encourages them to go further down the road.

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1992, Vol. 5, 317-329

Research in Medical and Health Professional Education: Current Bibliography†

Kenneth V. Jones and John Noyce

In late 1989, the ANZAME* Executive devoted the major part of one of its meetings to the consideration of ways to encourage research in medical and health professional education. Many problems hindering medical education research were discussed - lack of targeted funding; lack of support, and even interest, within institutions; and the uncertainties of would-be researchers with regard to the literature in this area. It was in response to this last issue that this project developed. The aim of the project was to identify some of these uncertainties, and to examine ways in which they might be dealt with. The central feature of this project was the development, by John Noyce, of a Current Bibliography of Journals - supported by an ANZAME Seeding Grant in Medical Education - which accompanies this paper. This paper considers the question of how to utilise the literature simply and economically.

Content Experts or Educators?

Most of the problems of would-be researchers in the field of medical education (and even of consumers of this research) are the result of an institutional reality: the vast majority of us were hired for our expertise in a clinical or scientific content area, not for our background in, or even our capability for, education. The tertiary sector remains the only education sector where teachers are not required to be trained as teachers. The assumptions that "good research will produce good teaching", and that "university students are sufficiently motivated and mature that a lot of teaching technique is unnecessary", are still common, especially within the universities. With the latest round of institutional amalgamations in Australia, many more health professional educators are now in the universities. This has meant a greater exposure to the "publish or perish" ethos, and, regrettably, sometimes even a devaluing of teaching. Educators' time is limited, and the necessity to keep up with the literature in one's content area constrains one's ability to keep up in another. Even though dissatisfaction with existing courses and motivation for improvement may be high within our schools and faculties, uncertainty about tackling the educational literature may inhibit us from being systematic about change, and even from attempting change.

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* Australian and New Zealand Association for Medical Education.

† Reproduced by kind permission from Jones, K.V., & Noyce, J. (1991). Research in medical and health professional education: Current bibliography. ANZAME Bulletin, 18, 13-25.

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As Consumers of Information

The usual motivation to seek information is a sense that things are not going well, or that there could be a better way to do things. Few of us will have had the experience of finding a perfect solution, and wanting to check to see if anyone else knows about it yet. In any case, since we are primarily educators rather than educationists, change tends to underlie our search for information.

In order to produce change from within the educational institutions, it is necessary to have a clear idea of what needs changing, and what can be changed. We are all aware of areas in our own courses that the students find boring, or of questionable value. The decision to change these elements needs to be based on data, however, because there may well be interest and value in those areas that are simply being hidden by poor educational approaches.

Alternatively, change may be forced from outside the institutions. Community pressure, influence of professional bodies and institutional constraints may all force changes in courses - often without at the same time providing further direction to the change demanded. The result can be disaster, unless we know what we are doing. In circumstances such as these, we need to become informed consumers of the literature in medical education. The questions to be considered include: 1) What is known about the approach now in use? What works and what doesn't? How do we keep the baby while disposing of the bathwater? Can sufficient improvement be achieved within the present model (for example, through development of teaching skills in our teachers), or is an entirely different model needed? 2) What alternative approaches exist? How have others dealt with the same kind of problems? What has worked because of its intrinsic appropriateness to one setting, and what has worked because of common principles? (This is a particularly complex question when the best answers may come from disciplines other than our own. 3) How ought changes to be prepared, "sold" to colleagues, and/or implemented? What mistakes have resulted in the failure of desirable changes? How can stumbling blocks be overcome?

As Transmitters of Information

On the other hand, we may have obtained information that we wish to share with others. This could range from information that has been acquired incidentally - as part of evaluation of a course, for example, or from experience as a teacher - to carefully planned research results obtained specifically to test an hypothesis. As potential transmitters of information, particularly as first time transmitters, a different set of uncertainties about the literature may affect us.

1. Is the information "old hat"? Have others been doing this for so many years that they do not even think it worthy to comment on? The most orthodox use of the literature may be to make sure that old mistakes are not repeated, and that we are not constantly "re-inventing the wheel". This sounds simple until one realises that *Excerpta Medica* alone covers some 4,700 journals.

2. Is the information naive? How does it fit into educational thinking? Is there a better way to conceptualise it? Is some unrecognised element at work, different from the one that we believe to be critical?
3. Is there anyone out there who wants to hear about these results? If so, who? How do I reach them? What is the most direct path? Should a broad or narrow range of consumers be the target?

Reducing Uncertainty

Whether as a consumer or a transmitter of information, there are a few rules that may help in the reduction of uncertainty about the medical education literature.
1. The task is not as big as it may appear. You will note from the bibliography that the specialist medical and health professional *education* journals all fit on one page. The big problem is locating these journals as not all may be in the library at a given institution. Once located, however, a brief session in the library from time to time will enable anyone to keep up with what's in these, and whether any of it is relevant. This may lead you to specific references in other journals that should be read.
2. The task can be reduced. Admittedly, the number of journals that occasionally print education articles is large. However, it is usually possible to decide on a fraction of it that is most likely to be useful. If the question is specific to one profession, or a subspecialty, only the literature for that profession or subspecialty is urgent. If it is concerned with broad educational principle, this specialist literature can be set aside, and the educational literature becomes the focus of attention.
3. There are shortcuts. The shortest may be to ask somebody. In each institution there will be several people who share an interest in educational issues. By talking to one another, the task of finding out what's going on, and where it has been written up, may be reduced. Experts in the area are usually happy to help out non-experts.

Tackling the Literature

1. Journals

The appended list of journals dealing with medical education involved much hard work; we hope you find it useful. To find Australian library locations of a specific journal you will need to consult the microfiche National Union Catalogue of Serials available in most libraries. You may need to use the earlier *Scientific Serials In Australian Libraries* for older titles.

For subject listings of journals in Medicine use *List Of Journals Indexed In Index Medicus,* and also *Ulrich's International Periodical Directory.*

2. Databases

The major database in the medical field is *MEDLINE* produced by the US National Library of Medicine. It is available online and, more recently, in CD-ROM format. Its print counterpart is *INDEX MEDICUS* (*Medline* also includes indexing from *Index to Dental*

Literature and *International Nursing Index*). The CD-ROM version is available through eight different publishers, with the Silver Platter version the most popular in Australia (distributed by Aldus). To use it properly you will need an initial session with an experienced user (your librarian will be pleased to assist), and some familiarity with MeSH- the *Medical Subject Headings Thesaurus* (Medical Education is under "Education, Medical" but Nursing Education is under "Nursing..."). For a quick search of recent years the *MEDLARS CD-ROMs* are invaluable, but for a comprehensive search (1966 to date), you will still need an outline *MEDLARS* search which should be done by an experienced librarian. It is important also to realise when using the CD-ROMs that only the major Australian and New Zealand medical titles are indexed on *MEDLARS*. For the rest of the ANZ titles there is a special subset on the online *Australian Medline Network* (*Medlars* can also be searched through a variety of other online hosts).

The great rival to *Index Medicus* is *EXCERPTA MEDICA* which is issued in 52 printed sections, each covering a major subject, e.g., cardiology, psychiatry. The journals coverage is greater (4,700 to 2,700 on *Medline/Index Medicus*). The CD-ROM versions are now becoming available in Australia on Silver Platter (Aldus).

Other databases which you may need to use, depending on subject, include:
BIOLOGICAL ABSTRACTS (printed, online & CD-ROM)
PSYCHLIT (the online/CD-ROM version of the printed Psychological Abstracts)
ERIC (education: print and CD-ROM version)
LIFE SCIENCES COLLECTION (CD-ROM)
CLINMED-CD (CD-ROM)
HEALTHPLAN-CD (CD-ROM)
CINAHL (CD-ROM version of the printed *Cumulative Index to Nursing and Allied Health Literature)*
(see R. Farbey, Medical Databases 1988 (3rd ed.), London: Aslib, 1987; and R.K. Fryer et al. Beyond Medline: a review of ten non-Medline CD-ROM databases for the health sciences, Laserdisk Professional, May 1989: 27-39).

For scanning current issues of medical journals, *CURRENT CONTENTS: LIFE SCIENCES* and *CURRENT CONTENTS: CLINICAL MEDICINE* are invaluable. Both are now also available on floppy disc from the US Institute for Scientific Information (ISI).

If you have details of a key paper, author, or organisation in your subject, use can be made of another ISI publication, the *SCIENCE CITATION INDEX*. When using the print version you will need a magnifying glass and much patience. There is a CD-ROM version.

3. Monographs

Good general books on education can serve as an excellent entry point to the literature. They range widely where journal articles may only provide a narrow focus. In fact, a well written monograph can be very similar to consulting a friendly expert. Some examples that may be useful include:

Newble, D., & Cannon, R. (1987). A handbook for medical teachers. 2nd ed. Lancaster, UK: MTP Press, 157 p.

This well-presented handbook from two authors at the University of Adelaide is a good introduction to the field of medical education.

Other titles of interest include:

Barrows, H.S., & Tamblyn, R.M. (1980). Problem-based learning: An approach to medical education. New York, NY: Springer Publishing Co.

Cox, K.R., & Ewan, C.E. (Eds.) (1987). The medical teacher. 2nd ed. Edinburgh, United Kingdom: Churchill-Livingstone.

Hubbard, J.P. (1971). Measuring medical education. Philadelphia, PA: Lea & Febiger.

Miller, G., & Abrahamson, S. (1961). Teaching and learning in medical school. Harvard: Harvard University Press.

For health professions:

Boissoneau, R. (1980). Continuing education in the health professions. Rockville, MA: Aspen.

Ford, C.W., & Morgan, M.K. (Eds.). (1976). Teaching in the health professions. St. Louis, MI: Mosby.

McGuire, C.H. et al. (1983). Handbook of health professions education. San Francisco, CA: Jossey-Bass.

Several organisations produce monographic series, notably the (UK) Association for the Study of Medical Education (ASME) whose Booklets are also printed in the journal, *Medical Education*.

Several medical education centres produce regular monographs:

- Centre for Medical Education, University of Dundee, Scotland.
- Division of Research in Medical Education, University of Southern California, Los Angeles.
- Centre for Educational Development, University of Illinois College of Medicine, Chicago.
- School of Medical Education (formerly Centre for Medical Education, Research and Development), University of New South Wales, Australia.

4. Conferences

The Association of American Medical Colleges publishes the Proceedings of the *RESEARCH IN MEDICAL EDUCATION CONFERENCE*, which is the major annual gathering for medical educators in North America.

The Josiah Macy Jr. Foundation (USA) publishes the proceedings of its regular seminars and conferences on medical education (the 1988 seminar was on Clinical Education).

The *Proceedings of the WORLD CONFERENCE ON MEDICAL EDUCATION* are published by the World Federation for Medical Education.

5. Theses and Dissertations

DISSERTATION ABSTRACTS INTERNATIONAL lists doctoral theses with abstracts from North American universities. It is available online, in print, and on CD-ROM. For the United Kingdom see the *ASLIB INDEX TO THESES.* For dental theses see *INDEX TO DENTAL LITERATURE.* For nursing theses see *INTERNATIONAL NURSING INDEX.*

Continuing the Process

We hope the following bibliography will prove useful to you. In each case the information provided is title, [source], frequency of publication, and a recent example of relevance to medical and/or health professional education. It is divided into sections as follows:

1. Specialist medical and health professional journals
2. Higher education journals containing articles of relevance to medical and health professional educators
3 a. General medical journals containing occasional education articles
   b. Sub-specialist medical journals containing occasional education articles
4 a. General nursing journals containing occasional education articles
   b. Sub-specialist nursing journals containing occasional education articles
5. Health specialist journals, excluding medical and nursing, containing occasional education articles.

If there are other journals you find useful, please let us know, as we hope to keep this list current and distribute it widely.

We wish to thank Neil Paget for his comments on a draft of this paper.

CURRENT BIBLIOGRAPHY OF JOURNALS

John Noyce and Kenneth V. Jones

1. Specialist Medical and Health Professional Education Journals

ACADEMIC MEDICINE
[Association of American Medical Colleges (Formerly Journal of Medical Education)] 12pa.
eg. Medical school admission (65(3) Mar 1990: 133-189)

ANZAME BULLETIN
[Australasian and New Zealand Association for Medical Education] 4pa
eg. Assessing student performance in the clinical setting (16(2) Apr 1989: 8-17)

JOURNAL OF CONTINUING EDUCATION IN NURSING
[USA] 6pa
eg. Communication skills for continuing education in nursing (21(3) May 1990: 109-112)

JOURNAL OF NURSING EDUCATION
[USA] 9pa
eg. Nursing students' perceptions of anxiety-producing situations in the clinical setting (29(4) Apr 1990: 183-187)

MEDICAL EDUCATION
[Association for the Study of Medical Education (UK)] 6pa
eg. Medical student experience of London general practice teaching attachments (24(4) July 1990: 354-358)

MEDICAL TEACHER: AN INTERNATIONAL JOURNAL OF MEDICAL EDUCATION
[UK] 4pa
eg. Medical ethics education in the eighties: a study of five medical schools (11(2) 1989: 177-185)

NURSE EDUCATION TODAY
[UK] 6pa
eg. The lecture as a teaching method in modern nurse education (10(4) Aug 1990: 290-293)

NURSE EDUCATOR
[USA] 6pa
eg. Cheating among nursing students (15(2) May 1990: 32-35)

REVIEW OF ALLIED HEALTH EDUCATION
[USA] irregular (4:1981; 5:1985)
eg. Accreditation in the allied health professions (5, 1985: 107-125)

TEACHING AND LEARNING IN MEDICINE: AN INTERNATIONAL JOURNAL
[USA] 4pa
eg. The right place at the right time: an example of innovation in medical education (New Zealand) (1(3)1989: 171-175)

UNIVERSITY OF NEW SOUTH WALES SCHOOL OF MEDICAL EDUCATION NEWSLETTER
[Australia] 2pa

2. Higher Education Journals Containing Articles of Relevance to Medical and other Health Professional Educators

ASSESSMENT AND EVALUATION IN HIGHER EDUCATION: AN INTERNATIONAL JOURNAL
[University of Bath (UK)] 3pa
eg. Evaluation of a course in interviewing for first year medical students (12(3) Autumn 1987: 191-201)

AUSTRALIAN EDUCATION REVIEW
[Australian Council for Education Research] 2pa
eg. The profession of occupational therapy (30, 1990: 97-108)

AUSTRALIAN JOURNAL OF ADULT AND COMMUNITY EDUCATION
[Australian Association of Adult and Community Education] 3pa
eg. Continuing education for the health sciences (especially occupational therapy) (27(2) 1987: 22-28)

AUSTRALIAN SCIENCE TEACHERS JOURNAL
[Australian Science Teachers' Association] 4pa
eg. Some important areas of student assessment in science teaching (35(4) Nov 1989: 71-79)

BRITISH JOURNAL OF EDUCATIONAL PSYCHOLOGY
[British Psychological Society] 3pa
eg. Modelling medical decision-making under uncertainty (59(2) June 1989: 187-199)

BRITISH JOURNAL OF EDUCATIONAL TECHNOLOGY
[National Council for Educational Technology] 3pa
eg. Ergonomic factors and student learning (21(2) May 1990: 132-138)

COMPUTERS AND EDUCATION: AN INTERNATIONAL JOURNAL
[UK] 4pa
eg. A package of computer programmes for teaching experimental physiology and medical statistics (13(3) 1989: 219-222)

EDUCATION RESEARCH AND PERSPECTIVES
[University of Western Australia] 2pa
eg. A procedure for screening applicants to a tertiary institution (14(2) Dec 1987: 40-48)

EDUCATIONAL & TRAINING TECHNOLOGY INTERNATIONAL
[Association for Educational and Training Technology (UK)] 4pa
eg. Educational technology applied to medical training: success and failure in a cooperative venture in the Federal Republic of Germany (26(2) 1989: 113-121)

EDUCATIONAL MEDIA INTERNATIONAL
[International Council for Educational Media (France)] 4pa
eg. Uses of video in teacher training (23(4) Dec 1986: 133-177)

EDUCATIONAL PHILOSOPHY AND THEORY
[Philosophy of Education Society of Australasia] 2pa
eg. Science education (20(2) 1988: 1-81)

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[National Foundation for Educational Research (UK)] 3pa
eg. Managing school departments and faculties; towards better practice (31(2) June 1989: 98-112)

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[American Educational Research Association] 9pa
eg. Educational assessment (18(9) Dec 1990: 1-32)

EDUCATIONAL REVIEW
[UK] 3pa
eg. The management of curriculum time as it relates to student engaged time (42(1) 1990: 13-23)

EUROPEAN JOURNAL OF EDUCATION: RESEARCH, DEVELOPMENT AND POLICIES
[UK] 4pa
eg. Medical education in the European Communities: moving towards 1993 and beyond (24(4) 1989: 399-410)

HERDSA NEWS
[Higher Education Research and Development Society of Australasia] 3pa
eg. Problem-based learning at Lincoln Institute of Health Sciences (9(2) July 1987: 3-6)

HIGHER EDUCATION: THE INTERNATIONAL JOURNAL OF HIGHER EDUCATION AND EDUCATIONAL PLANNING
[Holland] 8pa
eg. Assessment in a problem-based medical curriculum (19(2) 1990: 123-146)

HIGHER EDUCATION QUARTERLY
[Society for Research into Higher Education (UK)] 4pa
eg. Loans for learning: the loans versus grants debate in international perspective (43(1) Winter 1989:76-87)

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[Higher Education Research and Development Society of Australia] 2pa
eg. Students' perceptions of priorities in nurse education (8(2) 1989: 117-127)

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[UK] 3pa
eg. Training for teamwork in health care (18(2) Spring 1986: 5-20)

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[UK (Formerly European Journal of Science Education)] 4pa
eg. Students' perceptions of the concept of health (7(3) July-Sept 1985: 307-323)

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[UNESCO Institute for Education (Germany)] 4pa
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[Institute of Biology (UK)] 4pa
eg. Biology and ethics (24(1) Spring 1990: 18-22)

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[Association for the Development of Computer-Based Instructional Systems (USA)] 4pa
eg. Medical students' attitudes toward the use of microcomputers as instructional tools (16(3) Summer 1989: 90-94)

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[UK] 4pa
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[National Association for Research in Science Teaching (USA)] 9pa
eg. Methodological limitations for the use of expert systems techniques in science education research (27(1) Jan 1990: 69-77)

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[Australian Institute of Tertiary Educational Administrators] 2pa

eg. Is ignorance bliss? The findings of the Women at Work Study Group at Lincoln Institute of Health Sciences (9(1) May 1987: 33-42)

MUSLIM EDUCATION QUARTERLY

[Islamic Academy (Cambridge, UK)] 4pa

eg. Islamic medical education: a way of fostering the Islamic Code of Medical Ethics (3(2) 1986: 57-75)

OPEN LEARNING: THE JOURNAL OF OPEN AND DISTANCE LEARNING

[UK] 3pa

eg. A comparative study of the effect of tutorial audio-tapes in teaching elementary statistics (5(1) Feb 1990: 53-56)

PHYSICS EDUCATION

[Institute of Physics (UK)] 6pa

eg. Medical physics undergraduate degree courses at university (24(4) July 1989: 227-231)

RESEARCH IN SCIENCE & TECHNOLOGICAL EDUCATION

[UK] 2pa

eg. Physics in medical diagnosis: implementation and evaluation of an applied science unit for high school (7(1) 1989: 93-105)

REVIEW OF EDUCATIONAL RESEARCH

[American Educational Research Association] 4pa

eg. Teaching as clinical problem solving: a critical examination of the analogy and its implications (58(4) Winter 1988: 482-505)

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[Association for Computing Machinery Special Interest Group on Computer Uses in Education (USA)] 4pa

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Change in Medical Education. A new network for medical education. King's Fund Centre, 126 Albert Street, London NW1 7NF, United Kingdom.

Health Action. Appropriate Resources & Technologies Action Group, 1 London Bridge Street, London SE1 9SG, United Kingdom.

Joint Medical Newsletter. Faculty of Medicine, University of Newcastle, N.S.W., 2308, Australia.

Journal of the Bahrain Medical Society. Editor, P.O. Box 26136, Manama, State of Bahrain.

KIT Newsletter (The International Newsletter of the Royal Tropical Institute in Amsterdam). Secretariat, KIT, Mauritskade 63, 1092 AD Amsterdam, The Netherlands.

Medizinische Ausbildung. Journal of the Gesellschaft für medizinische Ausbildung, c/o medizinische Fakultät, Universität Münster, Domagkstrasse 3, D-4400 Münster, Germany.

Network News: Health Learning. HLM Clearing House, Division of Development of Human Resources for Health, World Health Organization, 1211 Geneva 27, Switzerland.

Newsletter. Action in International Medicine. Secretariat, Windeyer Building, 46 Cleveland Street, London W1P 6DB, United Kingdom.

Newsletter. European Network for Development of Multiprofessional Education in Health Sciences. Secretariat, Department of General Practice, Postgraduate Medical School, Barrack Road, Exeter, Devon IX2 5DW, United Kingdom.

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NGO-WHO Newsletter. World Health Organization, 1211 Geneva 27, Switzerland.

Pedagogue. Perspectives on Health Sciences Education. The Editor, Program for Educational Development, Room 3N51 Health Sciences Centre, McMaster University, 1200 Main Street West, Hamilton, Ontario, Canada L8N 3Z5.

Prioritas Kesehetan/Health Priorities. Secretariat, Faculty of Medicine, Gadjah Mada University, Sekip 55281 Yogyakarta, Indonesia.

Research in Distance Education. The Centre for Distance Education, Athabasca University, P.O. Box 10.000, Athabasca, Alberta, Canada T0G 2R0.

Santé. Cahiers d'études et de recherches francophones. John Libbey Eurotext. 6, rue Blanche, 92120 Montrouge, France.

Teaching and Learning News. Eastern Mediterranean Regional Office, World Health Organization, P.O. Box 1517, Alexandria, Egypt.

WONCA News. World Organization of Family Doctors. Secretariat, 4th Floor, 70 Jolimont Street, Jolimont, Victoria 3002, Australia.

Some Recent Papers

With the generous consent of the Editors of Academic Medicine (formerly the Journal of Medical Education), Medical Education, Medical Teacher, and Teaching and Learning in Medicine we have reproduced the abstracts of a number of papers that may be of particular interest to readers of the Annals. Where it seemed of especial help to readers, who may not have easy access to comprehensive library facilities, we have added the references which were given at the end of a paper.

We have arranged the 53 abstracts under the following headings:
Administration, Assessment, Community-Oriented and General Practice, Educational Methods, Evaluation, Problem-Based Learning, Problem-Solving, Skills Training, Students' Learning, Research, and Teaching.

The addresses for ordering these journals are:

Academic Medicine: (formerly Journal of Medical Education): Association of American Medical Colleges, 1 Dupont Circle, N.W., Washington, DC 20036, USA

Medical Education: Blackwell Publishing Co., P.O. Box 87, Osney Mead, Oxford, OX2 ODT, United Kingdom

Medical Teacher: Carfax Publishing Co., P.O. Box 24, Abington, OX14 2UE, United Kingdom

Teaching and Learning in Medicine: Lawrence Erlbaum Associates, 365 Broadway, Hillsdale, NJ 07642, USA.

Administration

Managing the Initial Period of Implementation of Educational Change. Shahabudin, H., & Safiah, N. (Malaysia). (1991). *Medical Teacher, 13,* 3.

Three years ago the University Kebangsaan Malaysia medical school changed its curriculum from the traditional discipline based curriculum to the integrated organ-system approach. Once change was effected a process of 'refreezing' had to be initiated whereby new reponses had to be reintegrated into the ongoing personality or emotional relationships of important people so that the change process will endure and become stable. During this refreezing process the faculty encountered several problems which could thwart further development of the new curricula if left unresolved. The nature of the problems seemed to indict that curricular change involves more than just efforts at bettering the what and ways of student learning and assessment. A lot of energy was also spent on keeping things going, keeping people motivated, making sure the work was done (at least as well as it has in the past), looking for better ways to do things, weighing new solutions and to be alert to new problems. In ensuring the continuance of change it was important to ensure, from the outset the institutionalisation of policies, programmes, procedures and practices for continuing reward, routinization, structural integration into the system, continuing evaluation and providing for continuing maintenance.

A Model of a Microcomputer Database System to Assist Medical Schools in Recruiting and Retaining Students. Furutani, J.C. (U.S.A.). (1991). *Academic Medicine, 66,* 114-118.

A model for a microcomputer database to ad a school's efforts to recruit and retain students is presented. The model is base upon a working system developed by the author at the University of Colorado Health Sciences Center. The article discusses data needs for adequate records of the recruitment and retention efforts, especially those concerning minority students, and how these records can be used to administer and evaluate programmes. The model provides a framework for microcomputer data files, record fields, relationships, and system development and maintenance considerations.

Estimating Impacts on Developing Countries of the Decrease in U.S. Training Opportunities for Foreign Medical Graduates. Harrington, W.J. Sr., Gotuzzo, E., Vial, S.U., Restrepo, J., Baldi, J., Young, P.M., Defillo-R, M., Guderian, R, & Harrington, W.J. Jr. (U.S.A). (1991). *Academic Medicine, 66,* 707-709.

Between 1973 and 1983, the number of foreign nationals from developing nations who entered the United States for graduate medical education decreased by approximately 90%. Many of those who would have studied in the United States if this decrease had not occurred would have returned home to serve their countries. To estimate the impact of this loss, a survey was conducted in six major cities in Latin America between 1983 and 1989. Selected local medical students interviewed 554 physicians who had returned home after U.S. training and 60 of their classmates who had not trained there. The findings indicate that the returned physicians had given approximately twice as much time to teaching, research, and medical administration as did those who had not left home. The authors maintain that this and related findings show how the curtailment of opportunities for training foreign nationals in the United States is detrimental to both the aspirations of developing nations and the influence of the United States in world affairs.

Assessment

Rethinking Critical Issues in Performance Assessment. Friedman, M., & Mennin, A.P. (U.S.A.). (1991) *Academic Medicine, 66,* 390-395.

The recent interest of medical schools and licensure organisations in establishing performance assessment methods in medical education presents new challenges to medical educators. The problems encountered in establishing the reliability and validity. The authors examine the relationship between Classical Test Theory and job performance. They discuss several critical issues: the meanings of reliability and validity in performance assessment and the balance between them (including simple versus complex behaviours), stability of performance, specific versus generic abilities, and the role of experts in clinical performance assessment. The authors call for a critical appraisal of applying Classical Test Theory to the assessment of job-related behaviours.

Pitfalls in the Pursuit of Objectivity: Issues of Reliability. Van der Vleuten, C.P.M., Norman, G.R., & De Graaf, E. (Canada, The Netherlands). (1991). *Medical Education, 25,* 110-118.

Objectivity has been one of the hallmarks in the assessment of clinical competence in recent decades. A consistent shift can be noticed in which subjective measures are being replaced by objective measurement methods. In the transition from subjective to objective methods trade-offs are involved, both in the effort expended and in the range of behaviours assessed. The issue of the presumed superiority of objective measures is addressed in two successive papers.

In this paper a distinction is made between objectivity as a goal of measurement, marked by freedom of subjective influences in general, and objectivity as a set of strategies designed to reduce measurement error. The central claim of this paper is that these two approaches to assessment do not necessarily coincide. By reviewing a number of studies comparing subjective and objectified measurement methods, the claim of the supremacy of the latter with respect to reliability is discussed.

The results of these studies indicate that objectified methods do not inherently provide more reliable scores. Objectified methods may even provide unwanted outcomes, such as negative effects on study behaviour and triviality of the content being measured. The latter issues, related to validity, efficiency and acceptability, are discussed in a second paper.

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Pitfalls in the Pursuit of Objectivity: Issues of Validity, Efficiency and Acceptability.

Norman, G.R., Van der Vleuten, C.P.M., & De Graaff, E. (Canada, The Netherlands). (1991). *Medical Education, 25,* 119-126.

In a previous article the distinction is made between objectivity and objectification . Objectivity is considered a generic goal of measurement, marked by freedom of subjective influences in general, whereas the latter term is used to describe strategies to reduce measurement error. A survey of several studies indicated that objectified methods are not intrinsically more reliable than subjective measures.

In this paper the consequences of objectification are analysed for issues related to validity, efficiency, transparency, and effect of these methods on students and teacher. Several studies comparing objectified and subjective methods are surveyed for this propose.

The studies indicate that - as in the previous article on reliability - objectification and objectivity are not identical, and that there are many pitfalls in the objectification of measurement procedures. As a consequence, it is argued that objectified methods should not exclusively be chosen on the basis of their unconditional appeal to objectivity, but that the application of measurement methods should follow the specific purpose of the testing situation. In the context of the testing situation, arguments against and in favour of objectification should be weighted, and trade-offs are to be evaluated. The outcome of this evaluation may vary from situation to situation, and from institution to institution.

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Validity and Generalisability of Global Ratings in an Objective Structured Clinical Examination. Cohen, R., Rothman, A.I., Poldre, P., & Ross, J. (Canada). (1991).

Academic Medicine, 66, 545-548

The performance of foreign medical graduates on multistation standardised patient-based tests was used to determine the validity and generalisability of global ratings of their clinical competence made by expert examiners. Data were derived from the entrance examinations of the 1989 and 1990 applicants to the Ontario Pre-Internship Program and the exit examination of 24 participants from the 1989 cohort. For each candidate, the examiners completed a detailed checklist and two five-point global ratings dealing with the candidate's approach to the patient's problem and attitude toward the patient. Generalisability coefficients for both ratings were satisfactory and stable across cohorts. Construct validity of the global ratings was demonstrated by comparing entry and exit ratings and by evidence of significant and positive correlations between the global ratings and total test scores. Tentative evidence of criterion validity of the global ratings was demonstrated. These findings suggest that global ratings by expert examiners can be used as an effective form of assessment in multistation standardised patient examinations.

A Multi-Institutional Trial of an Objective Structured Clinical Examination. Petrusa, E.R., Blackwell, T.A., Carline, J., Ramsey, P.G., McGaghie, W., Colindres, R., Kowlowitz, V., Mast, T.A, & Soler, N. (U.S.A.). (1991). *Teaching and Learning in Medicine, 2,* 86-94.

This study investigated the feasibility of implementing the same 10 cases in an objective structural clinical examination (OSCE) to evaluate medical students' clinical skills following the medicine clerkship at four geographically dispersed medical schools. Results indicated that a clinically equivalent, standardised test of clinical performance could be developed at multiple schools. Generalisability of student scores ranged from .26 to .50. Overall performance averaged 63%, with case scores ranging from 74% for a history of recurrent urinary tract infections to 52% for fever and cough. Significant differences were found among schools for individual cases, but performance from any one school was not consistently highest. Clinical skills scores ranged from 72% for physical examination technique to 58% for initial management, with varying significant differences among schools, suggesting inconsistent clinical training within and among schools. Performance was not higher for students examined later in the third year. Participant reactions were generally favourable. Results support the feasibility of implementing standardised OSCEs that would provide important data on the performance of graduates and on the adequacy of clinical education from different medical schools.

The Influence of the Introduction of Objective Structured Practical Examinations in Physiology on Student Performance at King Faisal University Medical School. Dissanayake, A.S., Ali, B.A., & Nayar, U. (Saudi Arabia). (1990). *Medical Teacher, 12,* 3-4.

The Department of Physiology at the College of Medicine and Medical Sciences, King Faisal University (KFU) had serious concerns about the effectiveness of these practicals.

A new form of evaluation, the objective structured practical examination (OSPE), was introduced in June 1987. At KFU, the introduction of OSPE has led to a marked improvement in the mean scores for the laboratory component of the final examinations in the physiology courses. Such an improvement was not consistently observed in the other components of the examinations. Performance in stations evaluating skills was in general better than in those testing analytical and interpretive abilities.
Female students performed significantly better in OSPE than male students in 4/5 and 3/5 physiology I and II examinations. Such gender differences were not observed in the written examinations.

Reliability and Feasibility of Measuring Medical Interviewing Skills: The Revised Maastricht History-Taking and Advice Checklist. Van Thiel, J., Kraan, H.F., & Van der Vleuten, C.P.M. (The Netherlands). (1991). *Medical Education, 25,* 224-229.
Medical interviewing skills are integral to good medical care. In order to measure these skills an instrument has been developed, called the Maastricht History-Taking and Advice Checklist (MAAS). It has been studied with regard to interrater reliability and validity. In this study a revised version of the MAAS (MAAS-R), a check-list of concrete interview behaviour, has been investigated concerning feasibility and reliability for examination purposes. Audio-recordings were obtained of 24 doctors, each interviewing eight different standardised patients. The recordings were independently scored by three general practitioners trained in using the MAAS-R. The results of generalisability analysis, considering the influences of doctors, cases and raters, are encouraging. In order to overcome case-specificity, feasible and reliable measurement can be accomplished with 8-10 cases in 2-2 1/2 hours of testing time, each case being scored by a different rater. Reliability improves considerably if assessment is restricted to basic interviewing skills.

A Review of the Validity and Accuracy of Self-Assessments in Health Professions Training. Gordon, M.J. (U.S.A.). (1991). *Academic Medicine, 66,* 762-769.
Valid self-assessment is fundamental to continuing professional competence but is seldom explicitly taught in health professions training. This review analysed 16 scholarly articles published between January 1970 and February 1990 (14 articles regarding health professions trainees, and four concerning college students or graduate trainees) in which it was possible to compare performance as self-assessed by trainees with performance as assessed by experts or objective tests. The validity of self-assessed performance was found to be low to moderate and did not improve with time in conventional health professions training programs. Self-assessed performance seemed closely related to generalised self-attributions and was minimally influenced by external feedback in the form of test scores, grades, or faculty assessments. In five programs, emphasizing explicit self-assessment goals and training strategies, moderate-to-high validity outcomes or improvements over time were demonstrated. Much of what passes for self-assessment in training seems the exercise of an underdeveloped

skill, but effective training to improve validity and accuracy is available and feasible.

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Test Security in Examinations That Use Standardised-Patient Cases at One Medical School. Colliver, J.A., Barrows, H.S., Viet Vu, N., Verhulst, S.J., Mast, T.A., & Travis, T.A. (U.S.A.). (1991). *Academic Medicine, 66,* 279-282.

The use of performance-based examinations consisting of standardised-patient (SP) cases has increased greatly in recent years. These examinations are typically long and thus require the presentation of the same SP cases to several consecutive examinee groups. Consequently, concerns have arisen about the potential for violations of test security whereby students who were tested early in the examination period pass on information to students tested later. These concerns are addressed using data from the SP-based examinations administered to five classes (1986-1990) of senior medical students at Southern Illinois University School of Medicine. Because of the length of the examinations, each class was randomly divided into five groups and the examination was administered to one group at a time, requiring three days of testing time per group and three weeks of testing time per class. The results showed no consistent, systematic changes in case means across the five groups tested at different times throughout the examination periods, and thus provide no evidence of serious, widespread violations of test security.

The Accuracy of Standardised Patient Presentation. Tamblyn, R.M., Klass, D.J., Schnabl, G.K., & Kopelow, M.L. (Canada). (1991). *Medical Education, 25,* 100-109.

The accuracy of standardised patient clinical problem presentation was evaluated by videotape rating of a random sample of 839 student-patient encounters, representing 88 patients, 27 cases and two university test sites. Patient-student encounters were sampled from a collaborative inter-university final-year clinical examination of fourth-year medical students which was conducted at the University of Manitoba and Southern Illinois University in 1987 and 1988. The accuracy, replicability and portability of standardised patient cases were evaluated. The average accuracy of patient presentation was 90.2% in 1987 and 93.4% in 1988. Perfect accuracy scores were obtained by 15 patients; however, 11 patients had average scores below 80% with the accuracy of presentation in some encounters being as low as 30%. There were significant differences in the accuracy score achieved by patients trained together for the same case in 6 of 35 possible comparisons. There was also a systematic trend for patients trained at Southern Illinois to be more accurate in their presentation than patients trained at the university of Manitoba. These differences were significant in 5 of the 15 cases used in the examination.

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Sources of Unreliability and Bias in Standardised-Patient Rating. Tamblyn, M., Klass, J., Schnabl, K., & Kopelow, L. (Canada, U.S.A.). (1991). *Teaching and Learning in Medicine, 3,* 74-85.

In tests of clinical competence, standardised patients (SPs) can be used to present the clinical problem and rate actions taken by the examinee in the patient encounter. Both these aspects of the "test" have the potential to contribute to unreliability and bias in measurement. In 1987, two universities collaborated to develop and execute the same SP test to clinical clerks in their respective institutions. This provided us with the opportunity to evaluate rating bias attributable to test site and three sources of rating unreliability within the same population of raters: those attributable to inconsistence is within the same rater (within-rater reliability), those attributable to inconsistencies between two raters trained in the same test site (between-raters reliability-same site), and those attributable to inconsistencies between two raters trained in different test sites (between-raters reliability-different sites). A stratified random sample of 537 of the 2,560 examinee-patient encounters that occurred in the inter-university examination was videotaped, providing equivalent representation of the 16 cases used in the test and the two universities. Videotaped encounters from both universities were rated by 44 SPs who presented and rated the case during the examination. Videotaped and examination ratings were used to estimate systematic rating bias and the three types of rater reliability. Overall, rater reliability of individual items and overall encounter score were fair to good (.37 to .52). Consistent with these results, raters within cases accounted for 20% of the observed variance in student scores. Within-rater reliability was better than both types of between-raters reliability. Rater agreement was not influenced by test site, but systematic differences in score were present between test sites. Site 1 raters scored the same students, on average, 6.7% lower than Site 2 raters. These differences had an impact on the proportion of students who would have failed the check list portion of the test. In Site 1, 50% of the students rated had data-collection scores below 60%, whereas, in Site 2, only 33% had scores below the 60% cutoff. The implications of these findings for single- and multi-site SP-based tests of competence are explored, and additional areas for research are identified.

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Effects of Using Two or More Standardised Patients to Simulate the Same Case on Case Means and Case Failure Rates. Colliver, J.A., Robbs, R.S., & Vu, N.V. (U.S.A.). (1991). *Academic Medicine, 66,* 16-618.

The effects of using two or more standardised patient (multiple SPs) to simulate the same case in a performance-based examination were studied at the case level by comparing case means and case failure rates for multiple SPs simulating the same case, using data from the classes of 1988, 1989, and 1990 at the Southern Illinois University School of Medicine. For total scores and scores on the students' written answers, the effects on means and failure rates were negligible and could be explained as due to sampling error. For scores on the checklists completed by the SPs, there were more significant differences than would be expected by chance alone, even though the number of significant differences was relatively small. The results demonstrate a need for caution in the interpretation of scores obtained from a case checklist completed by multiple SPs, particularly in regard to making pass-fail decisions.

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Colliver, J.A., Dawson-Saunders, B., & Verhulst, S.J. (1991). Assessing the magnitude of the effect of using two or more (multiple) standardised patients to simulate the same case on measurement error and intercase reliability. In: I.R. Hart (Ed.). *More developments in assessing clinical competence.* Montreal, Canada: Can-Heal Publications Inc.(in press).

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Reliability and Efficiency of Components of Clinical Competence Assessed with Five Performance-based Examinations Using Standardised Patients. Colliver, J.A., Vu, N.V., Markwell, S.J., & Verhulst, S.J. (U.S.A.). (1991). *Medical Education, 25*, 303-310.

The present study was conducted to provide in-depth information on the reliabilities of measures of the separate components of clinical competence (e.g. data collection, test interpretation, diagnosis, etc.) assessed by a performance-based examination consisting of standardised patient cases administered to five classes of senior medical students at Southern Illinois University School of Medicine. In general, the reliabilities of the competencies as they were actually measured on the examination (using the number of cases on which each competency was actually measured) were small, with 54% less than 0.30 and 75% less than 0.40. For generalisability coefficients pooled across the five classes and projected to a common number of k=10 cases, two of the nine competencies had reliabilities in the 40s, a third was close to 0.40, and the remaining six were in the low 20s. The number of cases needed for the competencies to achieve the recommended reliability of 0.80 ranged from 45 to 170 cases, with six of the nine competencies requiring over 100 cases to reach the 0.80 level. The low reliabilities of these measures of the components of clinical competence raise serious questions about using the scores as indicators of student performance.

The Use of Patients as Student Evaluators. Henkin, Y., Friedman, M., Bouskila, D., Kushnir, D., & Glick, S. (Israel). (1990). *Medical Teacher, 12*, 279-288.

Current evaluation of medical students in their clinical clerkships is usually performed by their clinical tutors, and emphasizes knowledge, skills and behaviour. However, it is not at all certain that the clinical tutors adequately appreciate the behavioural aspects of the student-patient interrelationship. Since these interactions are not directly observed by the tutors, their evaluation is based largely on second hand information. In the present study, patient opinion regarding student behaviour was collected and compared to tutors' evaluation of the student. One hundred and eighty one patients and 31 clinical tutors evaluated 41 medical students during a 6 week internal medicine clerkship, using a specially designed patient questionnaire and tutors' rating form. An analysis of the correlation between tutors' individual rating parameters and the global score revealed high correlation for those parameters associated with clinical knowledge and skills, but lower correlations for parameters associated with students' relationship to patients. The study reveals difficulties associated with the evaluation of students by patients. The process is time-consuming, and introduces tension between students and patients. In addition the patients appeared to be poor discriminators in evaluating medical students. Finally, the study points out that tutors do not assign sufficient importance to the student-patient relationship in the global clerkship score.

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Observer Evaluation as a Tool for Field Level Evaluation of Performance. Weerakoon, P.K., & Fernando, D.N. (Sri Lanka). (1990). *Medical Teacher, 12,* 311-314.

A field-level assessment of the job performance of a category of health professionals was carried out using the technique of non-participant observation of client-health worker interactions. Presenting the data so obtained in the form of a 'performance profile' enabled identification of areas in which this category of health workers showed a lower level of performance, indicating areas where alterations in basic and in-service training programmes are required.

Investigating Whether Teachers Should be Given Assessments of Students Made by Previous Teachers. Cohen, G.S., & Blumberg, P. (Canada) (1991). *Academic Medicine, 66,* 288-289.

Based upon a consideration of data from the literature, a survey, and a problem-solving discussion at a national meeting, the authors suggest the following recommendations concerning the provision to faculty of previous assessment information on students. Students' problems noted by faculty should be shared with the faculty who subsequently teach them. Students must be central to the entire process of disclosing earlier assessment and should be encouraged to initiate the process. The data should be provided by all appropriate faculty and should be distributed to the student advisor and the dean's office for dissemination to the course director of the next unit. Confidentiality must be assured. The rationale for such a policy is discussed.

Community-Oriented and General Practice

Effects of an Expanded Medical Curriculum on the Number of Graduates Practicing in a Rural State. Stratton, T.D., Geller, J.M., Ludtke, R.L., & Fickenscher, K.M. (U.S.A.). (1991). *Academic Medicine, 66,* 101-105.

In 1973 the University of North Dakota School of Medicine (UNDSM), following the national trend toward four-year medical programmes, expanded its previous two-year medical school curriculum to include all four years of medical education. It was hoped that this change, along with a renewed emphasis on primary care-oriented residency training within the state, would encourage medical students to establish practices within the state. In 1985 the UNDSM's Center for Rural Health mailed questionnaires to the 2,230 living graduates of the UNDSM to document a variety of their personal and practice characteristics. Based on the responses to the 924 completed questionnaires, the authors found that: 1) the students from rural North Dakota were more likely than were urban students to practise in rural areas of the state, as were the students with primary care specialty training; 2) the alumni completing residencies in North Dakota following the curriculum expansion (1976-1985) were more than twice as likely to establish practices in North Dakota. It was concluded that recruiting medical students (preferably in-state "natives") from rural areas, training them in primary care specialty areas, and enabling them to remain in North Dakota for the duration of their medical training (including residency training) combined to exert a considerable "retaining" effect on the UNDSM alumni.

The Association of Teachers of Preventive Medicine's Recommendations for Postgraduate Education in Prevention. Collins, T.R., Goldenberg, K., Ring, A., Nelson, K, & Konen, J. (U.S.A.). (1991). *Academic Medicine, 66,* 317-320.

The *Guide to Clinical Preventive Services*, prepared in 1989 by the U.S. Preventive Services Task Force, assesses the effectiveness of 169 types of preventive interventions. In 1990, the Association of Teachers of Preventive Medicine formed a panel to review the guide and recommend ways it could be used to enhance both undergraduate and postgraduate medical education. This paper outlines the panel's recommendations of the types of knowledge and attitudes on which postgraduate medical education in prevention should be built. Detailed recommendations are presented, based on the summary findings of the guide, for residency education in prevention. Implementation of these recommendations will integrate preventive services into the continuum of medical care. These recommendations are presented to achieve the goal of educating physicians to approach the total patient, putting the patient's health rather than the disease process in the forefront of primary medical care.

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Implementing the Association of Teachers of Preventive Medicine's Recommendations into the Undergraduate Medical School Curriculum. Altekruse, J., Goldenberg, K., Rabin, D.L., Riegelman R.K., & Wiese, W.H. (U.S.A.). (1991). *Academic Medicine, 66,* 312-316.

In 1989, an expert panel appointed by the Association of Teachers of Preventive Medicine proposed minimum curricular content requirements for health promotion-disease prevention, including recommendations for timing, duration, and course sequencing during medical school. Making clinical preventive medicine an integral part of a primary care rotation is a central feature of the proposal. The panel presents recommendations for using the *Guide to Clinical Preventive Services*, which assesses the effectiveness of 169 types of prevention interventions, in both undergraduate and postgraduate medical education. Recommendations for incorporating the guide into the undergraduate medical school curriculum are outlined. The recommendations include options for using the guide as part of a curriculum in quantitative skills, in clinical preventive medicine, in a primary care rotation, as a health services and community dimension curriculum, and as part of continuing self-education. Recognising that teaching methods and curriculum structures are varied in preventive medicine, the panel designed the recommendations to be adaptable to all medical schools' programs. The recommendations are aimed at achieving the goal of making preventive medicine an integral part of the education, training, and practice of physicians.

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A Community Pre-registration Year: The Continuation of a Community-Oriented Medical School Curriculum. Porter, B. (Israel). (1991). *Medical Education, 25,* 151-154.

A voluntary community-based pre-registration year (internship) was created for graduates of a community-oriented medical school in Beersheva, Israel. Graduates were placed in community clinics which had been upgraded to meet the needs of the programme through provision of on-site laboratory facilities and specialist consultation, and placement of social workers and health education personnel in the clinics. The graduates participated in a weekly postgraduate education programme directed to their specific needs. There was a high degree of satisfaction with the programmes among the trainees, the clinic team members and the patients. Relatively few of the trainees indicated a desire to pursue careers entirely devoted to primary care, despite their positive evaluation of the pre-registration experience. Though this might have been explained by problems encountered in the programme, such as the lack of adequate on-site supervision and lack of support from the health service providers, external factors such as a general move of graduates towards more lucrative sub-specialties and the relative lack of status of family practice were probably the more significant reasons. Increasing focus on the internship year, in addition to the undergraduate and residency periods, is needed to help direct medical education to ambulatory settings.

Advanced Training in General Practice in the UK for Overseas Postgraduates. Al-Bashir, M., Bundred, P.E., & Stanley, I.M. (United Kingdom). (1991). *Medical Education, 25,* 60-65.

The strengths of general practice in the UK as a training environment for overseas doctors intending to implement the World Health Organization strategy "Health for All by the Year 2000" in primary care are identified. A course of advanced training for teachers and administrators of primary care is described and evaluated in terms of participants' academic achievements and wider issues, including influence upon the development of primary care in their countries of origin.

Teaching Health Promotion and Illness Prevention to Trainee General Practitioners. Hays, R.B. (Australia). (1991). *Medical Teacher, 13,* 223-226.

This study demonstrates that the provision of feedback based on the observation of videotaped consultations can be used to increase self-awareness of deficiencies in health promotion and illness prevention skills. Trainee general practitioners were found to have some awareness of deficiencies in this important aspect of general practice, and this awareness increased as a result of self-observation and the feedback. Performance was self-evaluated to be better at the end of the general practice term than at the beginning.

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Educational Methods

Teaching Acute Respiratory Infection Using Low-cost Aids. An Experience in Pondicherry, South India. Soudarssanane, M.B., Rotti, S.B., & Premarajan, K.C. (India).(1991). *Medical Teacher, 13,* 369-370.

The topic of acute respiratory infections (ARI) was taught to two successive batches of medical students in their first clinical year. The low-cost aids in the form of slide set, tape recorder and video cassette were used. The knowledge and attitude of students was assessed using a pre-test and a post-test, which showed a statistically significant improvement.

The Uses and Value of Autopsy in Medical Education As Seen by Pathology Educators. Hill, R.B., & Anderson, R.E. (U.S.A.). (1991). *Academic Medicine, 66,* 97-100.

A national meeting of pathology educators in 1989 provided the impetus for an exploration of new uses of autopsy in medical education. A month before the conference, the authors sent a questionnaire about the uses and value of autopsy in medical education to 120 persons registered to attend the conference. They used the 98 responses, representing 69 U.S. and Canadian medical schools, as the basis of a workshop on the place of autopsy in future medical education. The present article is a report of the authors' findings from the questionnaire and workschop. They found that the uses of autopsy go far beyond the traditional uses in teaching clinical pathophysiology, clinicopathologic correlations, clinical anatomy, gross and microscopic anatomy of disease, and visual skills. Emphasis was placed on the potential role of autopsy in education regarding legal/judicial proceedings, vital statistics, epidemiologic investigations, and public health, and in the understanding of such complex matters as medical fallibility, medical uncertainty, and grief. These purposes were seen as congruent with current societal concerns about the need to reverse the trend toward dehumanisation of medicine and physicians. The inability to realise these aims in the face of a precipitous drop in the autopsy rate is discussed.

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Distance Learning in a Local Setting: A Structured Learning Course for the Introduction of General Practice to Undergraduate Students. Kamien, M., Macadam, D., & Grant, J. (Australia). (1991). *Medical Teacher, 13,* 353-361.

This paper describes the development and evaluation of a structured introductory course in general practice. Following some of the principles developed in distance education, the Department provides everything the student needs for the formal learning requirement as well as detailed assistance in how best to tackle the selected topics. The course was reported to be demanding, relevant and enjoyable. The major areas requiring attention were in reducing the amount of reading required, help in learning to work in small student run groups and more one-to-one supervision of physical examination skills. With further refinement the course should be applicable to other medical schools in developed countries.

How to Produce Instructional Text for a Medical Audience. McLeod, P.J. (Canada). (1991). *Medical Teacher, 13,* 135-144.

Instructional text continues to play a major role in medical education. Production of this type of learning resource requires an understanding of the objectives of the learner and the characteristics of text which facilitate student learning. Success in producing effective readable text requires attention to the content as well as to the way it is presented. This review outlines the factors which have a major impact on those two elements.

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Lecture Handouts of Projected Slides in a Medical course. Amato, S., & Quirt, I. (Canada). (1990). *Medical Teacher, 12, no.3/4.*

Part of the teaching of clinical haematology to our third year medical students involves lectures given to the entire class. For the past several years, we have provided, at the beginning of each lecture, handouts on which are reproduced all or most of the 35-mm slides that will be projected during that lecture. The frames are positioned vertically on the left since of each page, thus allowing the students to add notes on the right side. There are advantages and disadvantages to this pedagogical method, but we believe that the former outweigh the latter.

Evaluation

The Effect of Compulsory Participation of Medical Students in Problem-Based Learning. Moore, G.T. (U.S.A.). (1991). *Medical Education, 25,* 140-143.

Problem-based learning (PBL) is an instructional method that has attracted many advocates since its introduction in medical education almost 20 years ago. PBL features the use of student-directed tutorials, medically relevant problems to set study objectives, and independent learning. Educators have worried that not all students will do well with this method. This study compared a group of students who had chosen to be in a PBL curriculum with a group who had not, as they undertook a curriculum that contained both PBL and lecture-based courses.

Academic performance was virtually identical regardless of learning method. Students slightly favoured the courses that featured the method they had originally chosen, but significantly larger proportion of students shifted their preference from the lecture to the problem-based approach than vice versa. Students' academic performance does not appear to suffer when they are involuntarily enrolled in a PBL curriculum and many come to prefer this type of curriculum.

Effects of Conventional and Problem-Based Medical Curricula on Problem Solving. Patel, V.L., Groen, G.J., & Norman, G.R. (Canada). (1991). *Academic Medicine, 66,* 380-389.

This study examined the reasoning processes of beginning, intermediate, and senior students in two medical schools with different curricular formats. One school had a conventional curriculum (CC) where basic science was taught one and a half years before the clinical training, and the other had a problem-based learning curriculum

(PBLC) where basic science was taught in the context of clinical problems and general problem-solving heuristics were specifically taught. The students were asked to give diagnostic explanations of a clinical case, both before and after being exposed to relevant basic science information. Two distinct modes of reasoning were identified, each reflecting a curriculum type. A predominantly "backward-directed" hypothetico-deductive mode of reasoning was found in the explanations of the PBLC students, and a "more forward-directed" pattern of reasoning was found in the explanations of the CC students. Students in the PBLC produced extensive elaborations using relevant biomedical information, which was relatively absent from the CC students' explanations. However, these elaborations were accompanied by a tendency to generate errors. These results have important implications regarding the strengths and weaknesses of the two types of curricula.

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Effects of Tutors with Subject expertise on the Problem-Based Tutorial Process. Silver, M., & Wilkerson, L. (U.S.A.). (1991). *Academic Medicine, 66,* 298-300.

With the increased interest in problem-based, small-group learning in medical education, a debate has arisen about whether the tutor should be an expert in the subject under discussion. This 1988 study at Harvard Medical School demonstrates that tutors' expertise has important effects on the process of discussion in a problem-based tutorial. In comparing discussions of subjects in which the tutors described themselves as expert with those in which they did not, the authors found that the tutors with expertise tended to take a more directive role in tutorials: they spoke more often and for longer periods, provided more direct answers to the students' questions, and suggested more of the topics for discussion. Tutor-to-student exchanges predominated, with less student-to-student discussion. These effects endanger an important goal of problem-based learning: the development of students' skills in active, self-directed learning.

Comparison of Faculty Members' and Students' Perceptions Concerning Performance Criteria and Evaluation Strategies at the University of New Mexico School of Medicine. Conran, P.B., Obenshain, S.S., & Anderson, R.E. (U.S.A.). (1991). *Academic Medicine, 66,* 553-557.

Faculty members' and students' perceptions concerning the relative importances of (1) various performance criteria for students and (2) strategies of evaluation were determined in 1989 by a questionnaire in a single medical school that had both a problem-based, student-centered curriculum and an organ-block curriculum (i.e., regular track). The greatest differences in the rankings of both areas were found between those given by the freshman and sophomore students in the problem-based curriculum and those given by the same groups in the regular track. The faculty members' perceptions tended to be closer to those of the students in the regular track.

Continuing Medical Education and Career Choice Among Graduates of Problem-Based and Traditional Curricula. Tolnai, S. (Canada). (1991). *Medical Education, 25,* 414-420.

A survey was conducted among graduates of two Canadian medical schools who have been in practice for more than 9 years. The purpose of the study was to test the hypothesis that graduates of a problem-based curriculum differ from graduates of a traditional curriculum in their attitude to and participation in continuing medical education (CME) activities. Differences were noted in the rate of participation in certain CME activities (attendance at national and international conferences and meetings) between specialists and family doctors in both groups of alumni. However, the data indicate that the differences in learning-teaching methods employed in the course of the undergraduate medical curriculum do not exert a decisive influence upon the learning habits of the graduates.

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Problem-Based Learning

Problem-Based Learning in a Surgery Clerkship. Blosser, A., & Jones, B. (U.S.A.). (1991), *Medical Teacher, 13,* 289-293.

The authors were member of the first group of medical students to participate in a newly modified third-year surgery clerkship at the University of Kentucky College of Medicine. The primary teaching methodology of this clerkship is problem-based learning (PBL). In this type of learning experience, students work with paper cases as though they were actual patients, using a method similar to that which they will later use as residents or practising physicians. The students make the decisions themselves, formulating differential diagnoses, eliciting relevant items from a history and physical examination, proceeding with a diagnostic work-up, and creating a treatment plan. This problem-based method increases students' use of resources, improves their retention of information, and helps them develop time management skills. Although the students believe that the clerkship as a whole should offer more opportunities for hands-on experience, they found the PBL component of the clerkship highly motivating, intellectually stimulating, and experientially satisfying.

Commentary on"Problem-Based Learning in a Surgery Clerkship". Schwartz, R.W. (U.S.A.). (1991). *Medical Teacher, 13,* 295-298.

The Department of Surgery at the University of Kentucky College of Medicine is developing a modified third-year clerkship which stresses active student involvement in the educational process, the stimulation of life-long intellectual curiosity, and the development of problem-solving and time-management skills. The cornerstone of this programme is problem-based learning (PBL). PBL places students in a situation in which they must identify the major learning issues and solve the clinical problems presented in a series of paper cases. The students learn and practice a problem-solving method which rekindles their intellectual excitement for medical knowledge. After completing this programme, the students are prepared and stimulated to be 'immersed' in the clinical setting through acting internships. The first students to complete the programme have articulated concerns about the mixture of traditional clerkship clinical activities and PBL. These concerns are being addressed in subsequent modifications of the clerkship.

Student-Directed Problem-Based Learning in General Practice and Public Health Medicine. Usherwood, T., Joesbury, H., & Hannay, D. (United Kingdom). (1991). *Medical Education, 25,* 421-429.
The development and implementation are described of a new 6-week course in general practice and public health medicine for final-year medical students. This course is based on the principles of student-directed problem-based learning in small groups and makes substantial use of student attachments to local general practices which act as learning resources. Student assessment is by profiles. Course evaluation is by qualitative feedback, and the results of this are presented. The course offers a flexible learning environment in which the aims of its designers and the goals of their students can be achieved.

The Construction of a 'Topic Tree': A Way of Familiarising a Teaching Staff to Problem-Oriented Learning in a Master's Programme in Public Health. Chastonay, P., Guilbert, J.J., & Rougemont, A. (Switzerland). (1991). *Medical Education, 25,* 405-413.
At the planning stage of a community-oriented and problem-based learning master's programme in public health it is indispensable to build a network of teachers, experts in specific fields, willing to guide the students in acquiring new competencies and ready to facilitate the experimental learning process. We discuss in this paper the construction and the utilisation of the 'topic tree'. In addition we show how the teaching staff get acquainted with that educational methodology by experimenting with it themselves (prior to the students). About 10 experts, each one a specialist in given fields, have conceptualised their approach in building a topic tree (concept tree); such a tree makes it possible to schematise the topics to be understood in order to solve a given problem and the relationship existing between actions to be undertaken. The experiment, meant to initiate the teaching staff in experimental learning procedures, was appreciated by all the experts, who considered it a creative and stimulating method. It also permitted the construction of a bibliography including key documents concerning each identified priority health problem. We discuss the utility and the relevance of our approach in the

perspective of initiating teachers in experiential learning based on problem-solving.

Problem-Solving

Formal Decision Supports in Medical Practice and Education. Christensen, C., Elstein, A.S., Bernstein, L.M., & Balla, I. (U.S.A., Australia) (1991). *Teaching and Learning in Medicine, 3,* 62-70.

Several formal, quantitative techniques have been developed to help physicians make diagnostic and treatment decisions. Despite the precision of these models, as well as growing documentation of systematic errors in intuitive reasoning, most clinicians choose not to utilise decision supports. This may be due to weaknesses inherent in formal models, practical problems implementing them in the clinical environment, or psychological discomfort that arises when physicians try to quantify diagnostic and therapeutic uncertainty or patients' preferences. An examination of these difficulties however does not reveal an adequate basis for rejecting formal decision techniques. Quantitative decision aids can have a positive impact on clinical reasoning and can provide a valuable educational tool for structuring clinical problems. These models can be used to help teach students how to select, structure, and process clinical information. Medical educators now have available models that will enable them to teach several aspects of clinical reasoning rather than rely solely on practice and experience for the development of this important skill.

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Medical Problem-Solving: An Exploration of Strategies. Ridderikhoff, J. (The Netherlands). (1991). *Medical Education, 25,* 196-207.

In contrast to factual knowledge the reasoning processes of doctors in their attempts to clarify the patient's problem has been a somewhat neglected domain of study. The rise of experimental psychology, clinical decision analysis, and problem-based learning fostered studies in this area. Several studies from different viewpoints have been performed, leading to a more profound understanding of these processes. I approached the issue from a general physician viewpoint which reverted to the old distinction between deductive and inductive reasoning. Within a group of 68 participating doctors (family doctors and general physicians) the inductive method was exclusively employed. From this finding we conjecture that the inductive type of reasoning is the predominant style in the medical world. The consequences as attached to the overall utilisation of the inductive method are far-reaching. Among other, process retracing as a feedback mechanism fails to function when it results from the intuitive nature of the (pattern-recognition) process. As a consequence we do not and can not know what we may learn from experience, good things as well as bad things. The inductive method is a method of practice and quick reaction, but it leaves us empty-handed as far as understanding and teaching are concerned.

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Teaching Medical Decision Making and Students' Clinical Problem Solving Skills. Rogers, J.C., Swee, D.E., & Ullian, J.A. (U.S.A.). (1991). *Medical Teacher, 13,* 157-164.

Medical students need to be taught explicitly about decision making to be prepared for the changing health care environment. Medical decision making curricula have received favourable responses from students and have influenced some aspects of student performance. Questions remain about the impact of the teaching on students' general problem solving skills. A 15 hour course covering decision making topics was presented during a preclinical elective preceptorship for 5 years. Problem solving ratings made by clinical supervisors for the third year psychiatry and internal medicine clerkships were not better for the students who had the instruction and clinical experience than for the students in the comparison group. The results suggest that this approach to teaching decision making requires further development and testing.

Skills Training

Psychomotor Skills for the General Professional Education of the Physician. Irby, D.M., Lippert III, F.G., & Schaad, D.C. (U.S.A.). (1991). *Teaching and Learning in Medicine,*

3, 2-5.
Although concern about the clinical skills of medical school graduates is increasing, there is little consensus among faculty about what the essential clinical skills are for the general professional education of the physician. To identify such a common core of psychomotor skills, a survey questionnaire was mailed to faculty at the University of Washington School of Medicine. Fourty-three skills were determined to be essential for mastery by more than 60% of respondents. These results were then validated by a committee of clerkship directors who refined the list to 28 skills that should be required for graduation. These data are being used to specify educational objectives and to design clinical performance examinations.

Training Medical Practitioners in Information Transfer Skills: The New Challenge.
Sanson-Fisher, R.W., Redman, S., Walsh, R., Mitchell, K., Reid, A.L.A., & Perkins, J.J. (Australia). (1991). *Medical Education, 25,* 322-333.
Traditionally, undergraduate medical education has concentrated on teaching students how to gather information or take medical histories from their patients. However, research increasingly indicates that there is a need for medical practitioners to improve their skills in information transfer in a way which will increase the probability that patients are active collaborators in their treatment. Consequently, Newcastle Medical School has sought to develop training packages for medical students in information transfer skills. This paper describes the resulting training programme with particular emphasis on the areas selected for training, the methods by which students are taught, the necessary interactional skills and the assessment procedures which are applied.
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To what Extent are Medical Interviewing Skills Teachable? Kraan, H.F., Crijnen, A.M., De Vries, M.W., Zuidweg, J., Imbos, T., & Van der Vleuten, C.P. (The Netherlands). (1990).
Medical Teacher, Vol. 12, No. 3/4, 315.

Growth patterns of medical interviewing skills during a 6-year undergraduate curriculum are assessed by studying 563 medical students taken from five year-groups, interviewing simulated patients. In a cross-sectional, quasi-experimental design their skills are rated by means of the Maastricht History-taking and Advice Checklist (MAAS), an observation instrument which measures five categories of interviewing skills pertaining to initial medical consultations. The findings suggest that the skills for "history-taking", "presenting solutions" and "structuring of the interview" are effectively learned. These learning effects result from a continuous small group teaching programme with expert and peer review of videotaped encounters with simulated patients. The teaching effects of this programme seem less for the skills pertinent to the phase of "exploring the reasons for encounter" and to the "basic interviewing skills", because the students' growing medical knowledge and the increasing ability to solve medical problems exert a counteracting influence on the acquisition of these easily deteriorating skills. The results might be helpful to curriculum planners in order to make their programmes for medical interviewing skills more effective.

Effects of Communication Skills Training on Students' Diagnostic Efficiency. Evans, B.J., Stanley, R.O., Mestrovic, R., & Rose, L. (Australia). (1991). *Medical Education, 25,* 517-526.

This study evaluates the impact of a training programme in communications skills on subsequent diagnostic efficiency. Videotaped history-taking interviews conducted by groups of specially trained and control groups of students were rated for their diagnostic efficiency by two medical practitioners. Students in the trained group had shown greatly increased skills in interviewing and interpersonal effectiveness as a result of their training.

A comparison of ratings given by the two experimentally naive, independent observers revealed that trained students were significantly better at eliciting full, relevant data from patients - they were diagnostically more efficient, but took no longer than their control group counterparts to elicit the information

Further research with the medical interview rating scale will clarify the skills required of medical students in interviewing and diagnosis and facilitate remedial training for students who show poor interview skills.

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Students' Learning

Approaches to Learning of Students in an Indonesian Medical School. Emilia, O., & Mulholland, H. (Indonesia). (1991). *Medical Education, 25*, 462-470.

This paper reports on a study of approaches to learning of undergraduate medical students in the University of Gadjah Mada, Indonesia. The Lancaster Approaches to Studying Inventory was translated into Indonesian and the translated form pilot tested. The instrument was then completed by 90 students, 30 each in first, second and fifth year in the Faculty of Medicine. It was found that Indonesian students generally gave higher rates than previous studies have reported. Factor analysis of their responses showed strong resemblances to other groups in the factors of meaning and reproducing orientation. Differences found in Indonesian students' responses were in strategic and non-academic orientations. There were differnces between the response pattern of first- third- and fifth-year students. It is concluded that the instrument is valid for use in Indonesia.

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Study Approaches of Nursing Students: Effects of an Extended Clinical Context.

Meyer, J.H.F., & Dunne, T.T. (South Africa). (1991). *Medical Education, 25,* 497-516.

In the first part of this study a comparison is made between the approaches to studying adopted by failing and achieving nursing college students. It is concluded that failing students manifest approaches to studying that are, in some respects, conceptually difficult to interpret. This conclusion is presented against a background of similar findings that have emanated from other recent studies on student learning.

The second part of this study investigates the influence of contextual perceptions on the manifestation of the approaches to studying adopted by achieving students. In thus exploring the manifestation of different forms of contextualised approaches to studying (which are referred to as study orchestrations) a distinction is made between the influences attributable to "conventional" and "clinical" sets of contextual variables. In an extension of previously reported studies, it is concluded that the combines set of these contextual variables explains significantly more of the variation in study approaches than the set of "conventional" variables. It is further concluded that, under the influence of an extended set of contextual variables, conceptually related, but differing forms, of study orchestration may be manifested; a general form which is readily interpretable in terms associated with "conventional" academic contextual variables and a clinical form which, in the present study, is associated specifically with a nursing academic environment. The implications of these conclusions for nursing education are discussed and areas for future research are indicated.

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Research

Can Medical Education be Researched. Lloyd, D.A. (Canada). (1991). *Medical Teacher, 13, no.2.*

Many medical educators are tempted or encouraged to conduct research into teaching techniques, methods of evaluation, and curricular change. These educators are generally career physicians who become distressed by their inability to apply the social science model of research to their project with impunity. This paper addresses the issues involved in conducting educational research and provides some suggestions for methodology that can be used.

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The Potential of the Academic Medical Center to Shape Policy-Oriented Rural Health Research. Rosenblatt, R.A. (U.S.A.). (1991). *Academic Medicine, 66,* 662-667.

Rural communities continue to have problems in gaining access to basic health care services, a problem exacerbated by persistent shortages of physicians, financially threatened rural hospitals, and weak local economies. Academic health centers can help to address the issues, not only by increasing the flow of their graduates to rural areas, but also by supporting health services research designed to shape public policy that effects the rural United States. Examples of such research include experiments designed to influence the locational decisions of medical students and residents, studies of the quality and cost-effectiveness of care in rural hospitals, and the testing of new ways to provide emergency medical care in rural areas. Such policy-oriented research is compatible with both the intellectual and the service missions of most medical schools; in addition, lessons learned in rural areas may be relevant in more urbanised areas.

Teaching

Retraining Faculty for the Problem-Based Curriculum at the University of Hawaii, 1989-1991. McDermott, J.F., & Anderson, A.S. (Hawaii). (1991). *Academic Medicine, 66,* 778-779.

The problem-based learning (PBL) curriculum, adopted by and increasing number of medical schools, requires retraining faculty for new roles as tutors with small groups of medical students. This study describes the procedures and results of four PBL training workshops (1989-1991) given at the University of Hawaii John A. Burns

School of Medicine. Eighty-eight faculty volunteers each answered a 20-item multiple-choice questionnaire testing their knowledge of PBL both and after they participated in workshop. The post test result were used to identify deficiencies in the tutors' knowledge and practice of both their role and their function. The authors conclude that these deficiencies, now identified, will be addressed in a systematic fashion in subsequent workshops.

Characteristics of Effective Clinical Teachers of Ambulatory Care Medicine. Irby, D.M., Ramsey, P.G., Gillmore, G.M., & Schaad, D. (U.S.A.). (1991). *Academic Medicine, 66,* 54-55.
This study identified characteristics of clinical teacher in ambulatory care settings that influenced ratings of overall teaching effectiveness and examined the impacts of selected variables of the clinic environment on teaching effectiveness ratings. A survey instrument derived from prior research and observations of ambulatory care teaching was sent to 165 senior medical students and 60 medicine residents at the University of Washington School of Medicine in 1988. A total of 122 (74%) of the seniors and 60 (71%) of the residents responded. Results indicate that the most important characteristics of the ambulatory care teacher were that they actively involved the learners, promoted learner autonomy and demonstrated patient care skills. Environmental variables did not have a substantial influence on these ratings.

A Multidisciplinary Programme to Improve the TeachingSkills of Incoming Housestaff. Pristach, C.A., Donoghue, G.D., Sarkin, R., Warfula, C., Doerr, R., Opila, D., Stern, M., & Single, G. (U.S.A.). (1991). *Academic Medicine, 66,* 172-174.
Residents at the School of Medicine and Biomedical Sciences at the State University of New York at Buffalo (SUNY at Buffalo) expressed an interest in receiving instruction in teaching skills. In 1988, under sponsorship of the Graduate Medical-Dental Education Consortium, faculty and residents implemented an orientation programme for 110 incoming house staff. Residents received instruction in large-group teaching skills, bedside teaching, small-group discussion, and student evaluation. The programme was rated positively by the residents, 5% of whom became instructors in the orientation programme for the following year. Because of the programme's structure, both faculty and housestaff receive training in teaching skills, which may lead to an overall improvement in the teaching of SUNY at Buffalo's medical students.

NETWORK INFORMATION

Full Members

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- College of Health Sciences, Ministry of Health, Bahrain
- Faculty of Health Sciences, McMaster University, Hamilton, Canada
- Faculty of Medicine, University of Sherbrooke, Sherbrooke, Canada
- Medical Faculty, Universidad de la Frontera, Temuco, Chile
- Xian Medical University, Xian, China
- Faculty of Medicine, Escuela Colombiana de Medicina, Bogotá, Colombia
- University of Havana, Havana, Cuba
- Faculty of Medicine, Suez Canal University, Ismailia, Egypt
- Jimma Institute of Health Sciences, Jimma, Ethiopia
- Fiji School of Medicine, Suvai, Fiji
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The Network of Community-Oriented Educational Institutions for Health Sciences

General Aim

The general aim of the Network is to provide mutual support to member institutions who wish to adapt their curricula to the health needs of the communities which they serve.

Main Objectives

There are five primary objectives:

- strengthening of membership institutions in their implementation of community-oriented learning and appropriate instructional methods;
- strengthening of faculty competences related to community-based education;
- developing techniques, approaches, methods and tools appropriate to a community-oriented curriculum, e.g. problem-based learning;
- promoting population concepts in the health services system and the curriculum;
- assisting institutions in countries that have decided to introduce innovations in the training of health personnel, with the ultimate goal to improve health care and to contribute to the achievement of "Health for All".

To achieve these objectives, several additional objectives have been identified:

- Facilitating the development of curricula for health professions which help students become competent in the solution of health problems of communities, as well as of individuals and families in a community context.

- Problem-based learning is seen as a powerful educational strategy to maximise students' acquisition of relevant knowledge, skills and attitudes. Specific considerations include:

  - the systematic selection of problems and population based concepts which represent the health needs of the community;
  - the definition of relevant skills, including skills in problem-solving, independent learning, critical appraisal of evidence, and teamwork;
  - the strengthening of teaching capability of staff related to community-orientation and problem-based learning;
  - the development of methods for curriculum design and learning tools appropriate to a community- and problem-based curriculum;
  - the design of procedures and tools for the assessment of student and graduate performance;
  - the evaluation of innovative programmes including their contribution to the develop-

ment of effective, efficient and humane health care, and the commitment to "Health for All by the Year 2000", as promoted by the World Health Organization.

- Implement health research programmes that include basic, applied and operational research that is relevant to health and health care problems in the community served by the institution. Particular attention is given to strengthening health systems and epidemiologic research.

- Establishing relationships with the health care services and health care delivery. This link is intended to promote coordination between health care services, health manpower development and the promotion of primary care.

- Describing and developing organisational and managament strategies which maximise the achievement of institutional goals within the community setting.

The Network sees community-orientation and problem-based learning as specific issues which merit particular emphasis at the present phase of evolution of education in the health sciences. As the needs for health care and the further development of the health sciences and practices change, the Network will reconsider its priorities in the education of health professionals.

Membership of the Network

Since 1979 the membership has grown to a total of 56 full member institutions, 93 associate member institutions and 44 corresponding members in 1992. There are four types of membership:

1. Full membership can be acquired by educational institutions for health sciences which implement community-oriented education and which are willing to collaborate with other institutions in achieving the goals of the Network. Full members have voting rights.

2. Associate membership can be acquired by institutions, organisations or groups of people which are interested in the objectives of the Network and the activities that flow from them and who wish to play an active part in them. Associate membership can also be acquired with a view to the acquisition of full membership at a later stage. Associate members may not vote.

3. Corresponding membership can be acquired by individuals who are interested in the objectives of the Network. Corresponding members may not vote.

4. Honorary membership will be granted to individuals who have rendered exceptional service to the Network. Honorary members may not vote.

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